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# Report on the individual review of the annual submission of Lithuania submitted in 2017*

## Note by the expert review team

*Summary*

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2017 annual submission of Lithuania, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 18 to 23 September 2017 in Bonn, Germany.

* In the symbol for this document, 2017 refers to the year in which the inventory was submitted, not to the year of publication

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## Abbreviations and acronyms

| | |
|---|---|
| 2006 IPCC Guidelines | *2006 IPCC Guidelines for National Greenhouse Gas Inventories* |
| AAU | assigned amount unit |
| AD | activity data |
| Annex A sources | source categories included in Annex A to the Kyoto Protocol |
| AR | afforestation and reforestation |
| Article 8 review guidelines | "Guidelines for review under Article 8 of the Kyoto Protocol" |
| $B_{AFTER}$ | biomass carbon stock on land immediately after conversion |
| $B_{BEFORE}$ | biomass carbon stock on land immediately before conversion |
| BOD | biochemical oxygen demand |
| C | carbon |
| CER | certified emission reduction |
| $CH_4$ | methane |
| CM | cropland management |
| $CO_2$ | carbon dioxide |
| $CO_2$ eq | carbon dioxide equivalent |
| CPR | commitment period reserve |
| CRF | common reporting format |
| CSC | carbon stock change |
| dm | dry matter |
| EF | emission factor |
| ERT | expert review team |
| ERU | emission reduction unit |
| EU | European Union |
| EU ETS | European Union Emissions Trading System |
| FM | forest management |
| FMRL | forest management reference level |
| $Frac_{RENEW}$ | fraction of total area that is renewed annually |
| GE | gross energy |
| GHG | greenhouse gas |
| GM | grazing land management |
| HFC | hydrofluorocarbon |
| HFC-143a | trifluoroethane |
| HFC-23 | fluoroform |
| HWP | harvested wood products |
| IE | included elsewhere |
| IEA | International Energy Agency |
| IEF | implied emission factor |
| IPCC | Intergovernmental Panel on Climate Change |
| IPPU | industrial processes and product use |
| KP-LULUCF activities | activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol |
| LNG | liquefied natural gas |
| LULUCF | land use, land-use change and forestry |
| N | nitrogen |
| NA | not applicable |
| NE | not estimated |
| $NF_3$ | nitrogen trifluoride |

| | |
|---|---|
| NIR | national inventory report |
| NMVOC | non-methane volatile organic compound |
| NO | not occurring |
| $N_2O$ | nitrous oxide |
| PFC | perfluorocarbon |
| QA/QC | quality assurance/quality control |
| Revised 1996 IPCC Guidelines | *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* |
| RMU | removal unit |
| RV | revegetation |
| $SF_6$ | sulfur hexafluoride |
| SIAR | standard independent assessment report |
| $SO_2$ | sulfur dioxide |
| UNFCCC Annex I inventory reporting guidelines | "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" |
| UNFCCC review guidelines | "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" |
| WDR | wetland drainage and rewetting |
| Wetlands Supplement | *2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands* |
| Ym | methane conversion rate |

# I. Introduction[1]

1. This report covers the review of the 2017 annual submission of Lithuania organized by the secretariat, in accordance with the Article 8 review guidelines (decision 22/CMP.1, as revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (decision 13/CP.20). The review took place from 18 to 23 September 2017 in Bonn, Germany, and was coordinated by Ms. Veronica Colerio, Mr. Roman Payo and Mr. Davor Vesligaj (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Lithuania.

Table 1
**Composition of the expert review team that conducted the review of Lithuania**

| *Area of expertise* | *Name* | *Party* |
|---|---|---|
| Generalist | Ms. Elena Gavrilova | The former Yugoslav Republic of Macedonia |
| | Ms. Kristina Saarinen | Finland |
| Energy | Ms. Veronika Ginzburg | Russian Federation |
| | Mr. Giorgi Mukhigulishvili | Georgia |
| | Mr. Dingane Sithole | Zimbabwe |
| | Mr. Hongwei Yang | China |
| IPPU | Ms. Emma Salisbury | United Kingdom of Great Britain and Northern Ireland |
| | Mr. Koen Smekens | Belgium |
| | Mr. David Glen Thistlethwaite | United Kingdom |
| Agriculture | Ms. Laura Cardenas | United Kingdom |
| | Ms. Yue Li | China |
| | Mr. Asaye Ketema Sekie | Ethiopia |
| LULUCF | Mr. Craig William Elvidge | New Zealand |
| | Mr. Agustín José Inthamoussu | Uruguay |
| | Ms. Thelma Krug | Brazil |
| | Mr. Harry Vreuls | Netherlands |
| Waste | Mr. Cristóbal Félix Díaz Morejón | Cuba |
| | Mr. Pavel Gavrilita | Republic of Moldova |
| | Mr. Igor Ristovski | The former Yugoslav Republic of Macedonia |
| Lead reviewers | Ms. Gavrilova | |
| | Ms. Saarinen | |

[1] At the time of publication of this report, Lithuania had submitted its instrument of ratification of the Doha Amendment, but the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

2. The basis of the findings in this report is the assessment by the ERT of the consistency of the Party's 2017 annual submission with the Article 8 review guidelines. The ERT has made recommendations that Lithuania resolve the findings related to issues,[2] including issues designated as problems.[3] Other findings, and, if applicable, the encouragements of the ERT to Lithuania to resolve them, are also included.

3. A draft version of this report was communicated to the Government of Lithuania, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

4. Annex I shows annual GHG emissions for Lithuania, including totals excluding and including the LULUCF sector, indirect $CO_2$ emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected, by gas, sector and activity for Lithuania.

5. Information to be included in the compilation and accounting database can be found in annex II.

## II. Summary and general assessment of the 2017 annual submission

6. Table 2 provides the assessment by the ERT of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2
**Summary of review results and general assessment of the inventory of Lithuania**

| *Assessment* | | | | *Issue or problem ID#(s) in table 3 and/or 5[a]* |
|---|---|---|---|---|
| Dates of submission | Original submission: 14 April 2017 (NIR), 14 April 2017, version 4 (CRF tables), 12 April 2017 (SEF-CP1-2016 and SEF-CP2-2016) | | | |
| | Revised submissions: 16 May 2017 (SEF-CP1-2016 and SEF-CP2-2016), 23 May 2017 (SEF-CP1-2016 and SEF-CP2-2016) | | | |
| | Unless otherwise specified, the values from the latest submission are used in this report | | | |
| Review format | Centralized | | | |
| Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable) | 1. Have any issues been identified in the following areas: | | | |
| | | (a) Identification of key categories | No | |
| | | (b) Selection and use of methodologies and assumptions | No | |
| | | (c) Development and selection of EFs | Yes | I.10, A.29, L.15, L.16, L.18, L.24, KL.1, KL.3 |
| | | (d) Collection and selection of AD | Yes | E.10, E.12, E.13, L.12 |
| | | (e) Reporting of recalculations | No | |
| | | (f) Reporting of a consistent time series | Yes | I.14 |

[2] Issues are defined in decision 13/CP.20, annex, paragraph 81.

[3] Problems are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

| *Assessment* | | | *Issue or problem ID[a](s) in table 3 and or 5[a]* |
|---|---|---|---|
| | (g) Reporting of uncertainties, including methodologies | No | |
| | (h) QA/QC | QA/QC procedures were assessed in the context of the national system (see para. 2 in this table) | |
| | (i) Missing categories/completeness[b] | Yes | E.13, I.13, I.17, L.4, KL.3 |
| | (j) Application of corrections to the inventory | No | |
| Significance threshold | For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines? | I.19 | |
| Description of trends | Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable? | Yes | |
| Supplementary information under the Kyoto Protocol | 2. Have any issues been identified related to the national system: | | |
| | (a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements | No | |
| | (b) Performance of the national system functions | No | |
| | 3. Have any issues been identified related to the national registry: | | |
| | (a) Overall functioning of the national registry | No | |
| | (b) Performance of the functions of the national registry and the technical standards for data exchange | No | |
| | 4. Have any issues been identified related to reporting of information on ERUs, CERs, AAUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR? | No | |
| | 5. Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission? | No | |
| | 6. Have any issues been identified related to the reporting of LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as follows: | | |
| | (a) Reporting requirements in decision 2/CMP.8, annex II, paragraphs 1–5 | No | |
| | (b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14 | No | |
| | (c) Reporting requirements of decision 6/CMP.9 | No | |

| *Assessment* | | | *Issue or problem ID[a](s) in table 3 and or 5[a]* |
|---|---|---|---|
| | (d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34 | NA | |
| CPR | Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18? | Yes | |
| Adjustments | Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol? | No | |
| | Did the Party submit a revised estimate to replace a previously applied adjustment? | NA | Lithuania does not have a previously applied adjustment |
| Response from the Party during the review | Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties? | Yes | |
| Recommendation for an exceptional in-country review | On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review? | No | |
| Question of implementation | Did the ERT list a question of implementation? | No | |

[a] The ERT identified additional issues and/or problems in all sectors that are not listed in this table but are included in table 3 and/or 5.

[b] Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

## III. Status of implementation of issues and/or problems raised in the previous review report

7. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 6 March 2017.[4] For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2017 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3
**Status of implementation of issues and/or problems raised in the previous review report of Lithuania**

| *ID[a]* | *Issue and or problem classification[b]* | *Recommendation made in previous review report* | *ERT assessment and rationale* |
|---|---|---|---|
| General | | | |
| G.1 | NIR<br>(G.8, 2016)<br>(G.8, 2015)<br>Transparency | Include in the NIR information explaining that the central archiving system of the Lithuanian Environmental Protection Agency is the central place where all the information required to develop the GHG inventory is archived and that, | Resolved. The Party has corrected this information (NIR p.56). |

[4] FCCC/ARR/2016/LTU.

| ID# | Issue and or problem classification[a] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | in addition, the archives maintained by the sector experts contain, for example, additional background information and calculation sheets. | |
| G.2 | National registry<br>(G.9, 2016)<br>(G.9, 2015)<br>Reporting under Article 7, paragraph 1, of the Kyoto Protocol | Amend the publicly available information on project activities undertaken under Article 6 of the Kyoto Protocol to include the years of ERU issuance in accordance with decision 13/CMP.1, annex, paragraph 46(c). | Resolved. The 2017 SIAR (part 2, p.14) reports that Lithuania has not acted on this recommendation and that the information was not included in Lithuania's NIR. However, during the review, the Party explained that the information on the years of ERU issuance is available online (http://www.laaif.lt/en/public-information-about-eu-greenhouse-registry/) and was amended to include the years of ERU issuance. |
| Energy | | | |
| E.1 | Fuel combustion – reference approach – liquid and gaseous fuels – $CO_2$<br>(E.6, 2016)<br>(E.6, 2015)<br>Accuracy | Use the correct oxidation rate of 1.00 for all fuels in the reference approach. | Resolved. The Party used the correct oxidation rate of 1.00 for all fuels in the reference approach. |
| E.2 | Fuel combustion – reference approach – liquid and gaseous fuels – $CO_2$<br>(E.6, 2016)<br>(E.6, 2015)<br>Accuracy | If discrepancies of more than 2 per cent occur between the $CO_2$ emission estimates under the reference and sectoral approaches, investigate and document the reasons for the discrepancies. | Resolved. The Party provided explanations for the discrepancies in the NIR (p.83). |
| E.3 | 1.A.1.a Public electricity and heat production – solid fuels – $CO_2$<br>(E.7, 2016)<br>(E.7, 2105)<br>Transparency | Include in the NIR transparent information on the choice of EFs for anthracite used in heat plants, particularly when the factors are outside the uncertainty range of the relevant EFs described in the 2006 IPCC Guidelines. | Not resolved. As in its 2016 NIR, the Party only reported (2017 NIR p.101) that the average value of the $CO_2$ EF for anthracite was used for the period 2000–2004 and variable yearly values for the period 2005–2015 following recommendations given by experts during the implementation of the European Commission project to provide assistance to EU member States with Kyoto Protocol reporting requirements. The information that the Party applied plant-specific $CO_2$ EFs based on EU ETS data (tier 3) for anthracite, and reference to the 2009 EU ETS report of the cement producer Akmenes Cementas, was provided only during the review and not included in the NIR. |
| E.4 | 1.A.1.a Public electricity and heat production – liquid fuels and other fossil fuels – $CO_2$<br>(E.8, 2016)<br>(E.8, 2015)<br>Transparency | Provide transparent information on the types of municipal waste combusted in public electricity and heat production, including a quantitative disaggregation of the biogenic and non-biogenic waste input, in the NIR. | Addressing. The Party provided a quantitative disaggregation of the biogenic and non-biogenic fraction of municipal waste for the period 2013–2015 in the NIR (annex III, pp.110 and 111). During the review, the Party indicated that the country-specific $CO_2$ EFs for municipal waste (biogenic and non-biogenic) are |

| ID# | Issue and/or problem classification[a] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | based on municipal waste composition, which was measured by the Laboratory of Heat Equipment Research and Testing (Lithuanian Energy Institute), and that municipal waste combusted using combined heat and power consists mainly of fabric, textile materials, leather, rubber and soft and hard plastic. |
| E.5 | 1.A.1.a Public electricity and heat production – biomass, peat and other fossil fuels – $CH_4$ and $N_2O$<br>(E.9, 2016)<br>(E.9, 2015)<br>Transparency | Correct the error in the NIR by changing the notation key "CS" (country specific) to "T1" (tier 1) for the $CH_4$ and $N_2O$ EFs for peat, biogas and used tyres in the relevant tables in the NIR and by correcting the information in the text. | Resolved. The Party corrected the error in the NIR by changing the notation key "CS" to "D" (default) for the $CH_4$ and $N_2O$ EFs for peat, biogas and used tyres in the relevant tables in the NIR (NIR pp.93 and 94) and by indicating that default EFs from the 2006 IPCC Guidelines were used for estimating $CH_4$ and $N_2O$ emissions. |
| E.6 | 1.A.1.b Petroleum refining – liquid fuels – $CO_2$<br>(E.10, 2016)<br>(E.10, 2015)<br>Transparency | Explain in the NIR that residual fuel oil contains both regular residual fuel oil and non-tradable residual oil, and provide the $CO_2$ EFs and information on how they are derived for both types of residual fuel oil. | Resolved. The Party provided information on how the $CO_2$ EFs for non-tradable residual fuel oil combusted at the refinery and tradable residual fuel oil were derived in the NIR (annex IV). Non-tradable residual fuel oil is combusted only at the refinery and is reported under category 1.A.1.b (petroleum refining). Plant-specific $CO_2$ EFs based on EU ETS data were applied for the non-tradable residual fuel oil presented in NIR table 3-20. The country-specific $CO_2$ EFs for tradable residual fuel oil are based on the measurements of petroleum products performed by the accredited Laboratory of Quality Research Centre of ORLEN Lietuva. The $CO_2$ EF for tradable residual fuel oil for 2015 (78.4 t/TJ) was provided in the NIR (annex IV, table 4-1). |
| E.7 | 1.B.2.b Natural gas – $CO_2$ and $CH_4$<br>(E.11, 2016)<br>(E.11, 2015)<br>Transparency | Explain in the NIR the methodology and data sources used to estimate $CO_2$ and $CH_4$ emissions for 1990–2004 for this category, namely by explaining that for 1993–2004 the average observed leakage rate (in per cent) in 2005–2014 was applied, and for 1990–1992 regression analysis was used. | Resolved. The Party reported information on the methodology and data sources used to estimate $CO_2$ and $CH_4$ emissions in the NIR (p.213). |
| IPPU | | | |
| I.1 | 2.G.3 $N_2O$ from product uses – $N_2O$<br>(I.7, 2016)<br>(I.7, 2015)<br>Transparency | Explain in the NIR that the decrease in $N_2O$ emissions from anaesthesia since 2008 is related to the decreasing use of inhalational anaesthesia (using $N_2O$) compared with injection anaesthesia, which has been more widely used in Lithuania recently. | Resolved. The Party provided an explanation for the decrease in $N_2O$ emissions from anaesthesia since 2008 (NIR p.296). |
| I.2 | 2.H Other (industrial processes and product use) – $CO_2$ | Include in the IPPU chapter of the NIR a reference to the section in the energy chapter where information on | Resolved. The Party provided a reference to where information on $CO_2$ emissions from limestone used for flue gas |

| ID[a] | Issue and/or problem classification[b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | (I.8, 2016)<br>(I.8, 2015)<br>Transparency | $CO_2$ emissions from limestone used for flue gas desulfurization is included. | desulfurization is included in the energy chapter (NIR p.299). |
| Agriculture | | | |
| A.1 | 3. General (agriculture) – $CH_4$ and $N_2O$<br>(A.12, 2016)<br>(A.12, 2015)<br>Transparency | Include in the NIR an explanation of how the average annual livestock data are derived for each animal type. | Resolved. The Party reported the approaches used to calculate the annual population of adult and growing animals (NIR p.305). |
| A.2 | 3.A Enteric fermentation – $CH_4$<br>(A.16, 2016)<br>(A.16, 2015)<br>Transparency | Include, in the NIR, tables showing the chemical composition of rations for cattle, sheep and swine per type of feed and the corresponding GE content per kg dm. | Resolved. The Party reported the chemical composition of the diet and diet nutrients, dm and GE contents for cattle (NIR annex VII, pp.129–133, tables A.5-2 to A.5-13), for swine (NIR annex VII, pp.133–136, tables A.5-15 to A.5-23) and for sheep (NIR annex VII, pp.136 and 137, tables A.5-24 to A.5-27). |
| A.3 | 3.A.1 Cattle – $CH_4$<br>(A.17, 2016)<br>(A.17, 2015)<br>Transparency | Include the correct Ym values applied for cattle in the NIR, with references to the data sources used. | Resolved. The Party reported the default Ym values, the corresponding references and the weighted average Ym (NIR pp.309 and 310). |
| A.4 | 3.A.1 Cattle – $CH_4$<br>(A.18, 2016)<br>(A.18, 2015)<br>Transparency | Include, in the NIR, tables showing feeding standards depending on dairy cattle milk yields as well as weight and growing rate of non-dairy cattle. | Resolved. The Party reported feeding standards for dairy cattle depending on milk yields (NIR p.311, table A.5-14) and weight and daily weight gain of non-dairy cattle (NIR annex VII, p.138, table A.5-30). |
| A.5 | 3.B.1 Cattle – $CH_4$<br>(A.19, 2016)<br>(A.19, 2015)<br>Transparency | Include in the NIR the information that cattle growing and forage preparation technology used in Lithuania is close to that of Western Europe to justify the use of the default maximum methane producing capacity value for non-dairy cattle for Western Europe instead of the value for Eastern Europe. | Resolved. The Party reported that higher-quality forage is produced using innovative technologies used in Western countries to meet the nutrition needs of high-productivity cattle (NIR p.325), thereby justifying the use of the IPCC default value for Western Europe for maximum methane producing capacity. |
| A.6 | 3.B.1 Cattle – $N_2O$<br>(A.21, 2016)<br>(A.21, 2015)<br>Transparency | Provide in the NIR mature body weight in moderate body condition (reference weight) for growing cattle, with supporting references. | Resolved. The Party reported mature body weight for non-dairy cattle subcategories, with supporting references (NIR annex VII, p.138, table A.5-30). |
| A.7 | 3.B.2 Sheep – $CH_4$<br>(A.22, 2016)<br>(A.22, 2015)<br>Transparency | Include in the NIR the explanation that the differences between default and country-specific values for volatile solids are influenced by national nutritional standards because Lithuania's calculation formula for volatile solids includes the GE value, which is based on sheep nutrition norms and feed nutrition tables provided in the Party's *Livestock manual* (2007). | Resolved. The Party explained that the difference between default and country-specific values for volatile solids is influenced by national nutritional standards (NIR p.324). |
| A.8 | 3.B.2 Sheep – $CH_4$<br>(A.22, 2016) | Explain in the NIR that lambs are usually weaned at four months old in | Resolved. The Party reported that lambs are usually weaned at four months old in |

| ID# | Issue and/or problem classification[a] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | (A.22, 2015) Transparency | Lithuania, and on this basis more feed is needed for ewes, which leads to a higher GE value. | Lithuania, and on this basis more feed is needed for ewes, which leads to a higher GE value (NIR p.324). |
| A.9 | 3.B.3 Swine – $CH_4$ and $N_2O$ (A.23, 2016) (A.23, 2015) Transparency | Include data about the swine population distribution between market and breeding swine, with supporting references, in the NIR. | Resolved. The Party reported swine population distribution between market and breeding animals, along with the relevant references (NIR annex VII, p.327, table A.5-29). |
| A.10 | 3.B.4 Other livestock – $CH_4$ (A.26, 2016) (A.26, 2015) Transparency | Include in the NIR the information that because a $CH_4$ EF for geese is not available in either the 2006 IPCC Guidelines or the Revised 1996 IPCC Guidelines, the Party applied the EF for poultry from the Revised 1996 IPCC Guidelines (volume 3, p.4.47, table B-7) for geese and reported that this EF is also used for other poultry. | Addressing. The Party reported inconsistent sources for the $CH_4$ EF for geese and other poultry. In NIR chapter 5.3.2.1, the Party reported that the EF for poultry manure management systems was taken from the 2006 IPCC Guidelines (NIR p.320, table 5-31). However, in NIR chapter 5.3.2.2 (p.327), the Party reported that a $CH_4$ EF for geese is not available in the 2006 IPCC Guidelines or in the Revised 1996 IPCC Guidelines, and therefore the EF for other poultry provided in the Revised 1996 IPCC Guidelines was used. During the review, the Party explained that it used, for geese and other poultry, the EF from the Revised 1996 IPCC Guidelines. |
| A.11 | 3.D.a.1 Inorganic N fertilizers – $N_2O$ (A.29, 2016) (A.29, 2015) Transparency | Explain in the NIR how the AD for inorganic fertilizer application have been derived for the last inventory year, in particular if extrapolation instead of actual data was used. | Resolved. The Party reported that the AD for inorganic fertilizer application for 2015 were derived by extrapolation (NIR p.345; CRF table 3.D). |
| A.12 | 3.D.a.2 Organic N fertilizers – $N_2O$ (A.30, 2016) (A.30, 2015) Comparability | Include data on the amount of N in bedding per animal species in the NIR, with an appropriate reference to the 2006 IPCC Guidelines. | Not resolved. The Party reported that the amount of N in bedding was not included in the estimations for category 3.D.a.2 due to lack of sufficient scientific data, but the associated $N_2O$ emissions were reported in category 3.D.a.3 crop residues (NIR p.347) (see ID# A.27 in table 5). |
| A.13 | 3.D.a.3 Crop residues – $N_2O$ (A.31, 2016) (A.31, 2015) Transparency | Update the description of this category in the NIR by including in NIR tables 5-54 to 5-56 data on all crop types included in the calculation and by correcting the fraction of pasture renewed in table 5-55 (0.2 instead of 1), with supporting references. | Not resolved. The Party has not reported N returned to soil by crop type. The NIR (p.352, table 5-57) indicates values for $Frac_{RENEW}$ of one year for annual crops, five years for perennial grasses and eight years for meadows, pastures and permanent pastures/meadows. The ERT noted that these values are not in accordance with those in the 2006 IPCC Guidelines (volume 4, chapter 11) (1, 0.2 and 0.125, respectively). During the review, the Party explained that the $Frac_{RENEW}$ values are one, five and eight years for annual crops, perennial grasses, and meadows, pastures and permanent pastures/meadows, respectively, as reported in NIR table 5-57. However, in the calculations, the values of $Frac_{RLNEW}$ used for annual crops, perennial grasses, and meadows, pastures and |

| ID[a] | Issue and/or problem classification[b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | permanent pastures/meadows were 1, 0.2 and 0.125, respectively, in accordance with the 2006 IPCC Guidelines. |
| A.14 | 3.D.a.3 Crop residues – $N_2O$ (A.32, 2016) (A.32, 2015) Transparency | Report the correct definitions for above-ground residues (straw and stubble) and below-ground residues (roots) in the NIR, in line with the 2006 IPCC Guidelines. | Resolved. The Party reported the definitions for above-ground residues and below-ground residues in line with the 2006 IPCC Guidelines (NIR pp.350–352). |
| A.15 | 3.D.a.6 Cultivation of organic soils (i.e. histosols) – $N_2O$ (A.33, 2016) (A.33, 2015) Transparency | Include in the NIR the organic soil definition and data source for AD. | Resolved. The Party reported the cropland and grassland areas, share of organic soils and data source (NIR pp.381, 435, 439, 447 and 451). The Party also reported the organic soil definition in the NIR (p.396). |
| A.16 | 3.D.a.6 Cultivation of organic soils (i.e. histosols) – $N_2O$ (A.34, 2016) (A.34, 2015) Transparency | Enforce the implementation of general QC procedures, which, according to the 2016 NIR (p.52), include the evaluation of the emission calculations by assessing the correctness of units to identify any unit errors in the calculation spreadsheets for this category, and report on improvements in the NIR. | Resolved. The Party corrected the units of the AD and EFs (NIR p.353), suggesting that QC procedures for this category have been enforced. Category-specific QA/QC procedures, including for cultivation of organic histosols, were reported in the NIR (section 5.6.1.4) |
| LULUCF | | | |
| L.1 | 4. General (LULUCF) – $CO_2$ (L.5, 2016) (L.5, 2015) Transparency | Report CSC in soils for forest land converted to settlements and other land across the whole 20-year period, or provide a justification for the assumption in the 2016 submission of instantaneous oxidation of soil organic matter in the year of conversion. | Not resolved. Lithuania did not provide this information in the NIR. During the review, the Party explained that the CSC in mineral soils from conversion of forest land to settlements and to other land was estimated assuming instantaneous oxidation and assuming that the carbon stock in forest land equals 72 t C/ha, using the default values from table 2.3 of the 2006 IPCC Guidelines and national data on forest soil types and areas. |
| L.2 | 4. General (LULUCF) – $CO_2$ (L.6, 2016) (L.6, 2015) Accuracy | Provide in the NIR additional information on the accuracy of AD estimates made using the two methods (National Forest Inventory sampling method used under the Convention and wall-to-wall method used under the Kyoto Protocol) for forest land converted to other land uses. | Resolved. The Party presented and explained the differences between the two methods (NIR p.571). |
| L.3 | 4. General (LULUCF) – $CO_2$ (L.6, 2016) (L.6, 2015) Accuracy | Consider and report in the NIR how the two data sets for forest land converted to other land uses (National Forest Inventory sampling method used under the Convention and wall-to-wall method used under the Kyoto Protocol) may be reconciled. | Not resolved. The NIR does not include explicit information on how the two data sets may be reconciled. |
| L.4 | 4.A.2 Land converted to forest land – $CO_2$ (L.7, 2016) (L.7, 2015) | Estimate and report CSC in mineral soils for land converted to forest land. | Not resolved. The Party reported CSC in mineral soils for land converted to forest land as "NE". |

| ID# | Issue and/or problem classification[a] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | Completeness | | |
| L.5 | 4.A.2 Land converted to forest land – $CO_2$ (L.7, 2016) (L.7, 2015) Completeness | If unable to estimate and report CSC in mineral soils for land converted to forest land, use the notation key "NE" instead of "NO" and provide a justification for the use of the notation key in the NIR and CRF table 9. | Resolved. The Party reported CSC in mineral soils for land converted to forest land as "NE". During the review, Lithuania indicated that it is planning to apply country-specific CSC estimates for mineral soils for land converted to forest land from other land uses in the next submission, using data from the project to estimate CSC in different land uses funded by the Norway grants programme under the Partnership Project on Greenhouse Gas Inventory. |
| L.6 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $CO_2$ (L.8, 2016) (L.8, 2015) Comparability | Instead of using the notation keys "NO" (for $CO_2$ emissions from drained organic soils on peat extraction lands) and "NE" (for $CO_2$ emissions from drained organic soils on cropland and grassland), use the notation key "IE" or report $CO_2$ emissions from drained lands in CRF table 4(II). | Resolved. The Party reported $CO_2$ emissions from drained organic soils on forest land, cropland and grassland in CRF table 4(II) and reported CSC in organic soils on forest land, cropland and grassland using the notation key "IE" in CRF tables 4.A, 4.B and 4.C. During the review, the Party explained that these emissions are reported in CRF table 4(II) (see ID# L.23 in table 5). |
| L.7 | 4(V) Biomass burning (settlements) – $CH_4$ and $N_2O$ (L.12, 2016) (L.12, 2015) Comparability | Use the correct notation key ("NO") for $CH_4$ and $N_2O$ emissions from biomass burning in settlements in CRF table 4(V) for the years when the activity did not occur. | Resolved. The Party used the notation key "NO" in CRF table 4(V) for $CH_4$ and $N_2O$ emissions from settlements for the entire time series. |
| L.8 | 4.G HWP – $CO_2$ (L.14, 2016) (L.14, 2015) Transparency | Complete CRF table 4.G and the additional information box on factors used to convert from product units to carbon, noting that Parties can do this by setting a custom node year within the data entry screen for HWP in the CRF Reporter software. | Resolved. The Party completed CRF table 4.G, including the additional information box on factors used to convert from product units to carbon for sawnwood and wood panels, and for paper and paperboard. |
| Waste | | | |
| W.1 | 5.D Wastewater treatment and discharge – $CH_4$ (W.6, 2016) (W.6, 2015) Transparency | Include information on sewage sludge application, incineration and deposition in the NIR or in the documentation box of CRF table 5.D. | Resolved. The Party reported information on sewage sludge application, incineration and deposition (NIR pp.509 and 510; CRF table 5.D). |
| KP-LULUCF | | | |
| | | There were no recommendations related to KP-LULUCF in the previous review report. | |

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue and/or problem was raised. Issues are identified in accordance with paragraphs 80–83 of the UNFCCC review guidelines and classified as per paragraph 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with paragraph 69 of the Article 8 review guidelines, in conjunction with decision 4/CMP.11.

# IV. Issues identified in three successive reviews and not addressed by the Party

8. In accordance with paragraph 83 of the UNFCCC review guidelines, and as documented in table 4, the ERT has assessed that there are no issues identified in three successive reviews that have not been addressed by the Party.

Table 4
**Issues identified in three successive reviews and not addressed by Lithuania**

| *ID[a]* | *Previous recommendation for the issue identified* | *Number of successive reviews issue not addressed* |
|---|---|---|
| General | | |
| | No such general issues were identified | |
| Energy | | |
| | No such issues for the energy sector were identified | |
| IPPU | | |
| | No such issues for the IPPU sector were identified | |
| Agriculture | | |
| | No such issues for the agriculture sector were identified | |
| LULUCF | | |
| | No such issues for the LULUCF sector were identified | |
| Waste | | |
| | No such issues for the waste sector were identified | |
| KP-LULUCF | | |
| | No such issues for KP-LULUCF activities were identified | |

# V. Additional findings made during the 2017 individual inventory review

9. Table 5 contains findings made by the ERT during the individual review of the 2017 annual submission of Lithuania that are additional to those identified in table 3.

Table 5
**Additional findings made during the 2017 individual review of the annual submission of Lithuania**

| *ID[a]* | *Finding classification* | *Description of the finding with recommendation or encouragement* | *Is finding an issue and or a problem[b]? If yes, classify by type* |
|---|---|---|---|
| General | | | |
| G.3 | Notation keys | The ERT noted recommendations in relation to the energy and LULUCF sectors to correct and improve the use of notation keys and the explanation in the NIR (e.g. see ID#s E.8, L.13 and L.14 below). | Not an issue/problem |
| G.4 | Annual submission | The ERT noted several recommendations to recalculate estimates and correct the errors identified during the review (e.g. see ID#s L.10, A.12, A.26, A.29, L.15, L.16, L.18, L.24, KL.1 and KL.3 below).<br>The ERT recommends that the Party explain transparently each recalculation made for the 2018 submission in the category-specific discussions in the NIR, with explanatory information and justifications for the recalculations.<br>The ERT encourages the Party to provide a discussion of the impact of the recalculations on the trend in emissions at the category, sector and national level, as appropriate. | Yes. Transparency |
| G.5 | Annual submission | The ERT noted several recommendations to complete the inventory by including categories currently not estimated or by improving the accuracy of the reported emissions (e.g. see ID#s E.13, E.14, L.17, L.19, A.29, L.18, L.24, KL.1 and KL.3 below).<br>If the Party reports categories as insignificant, the ERT recommends that the Party demonstrate that the total national aggregate of estimated emissions for all gases and categories considered insignificant remains below 0.1 per cent of the national total GHG emissions, as requested in the UNFCCC Annex I inventory reporting guidelines, paragraph 37(b), and include that information in the NIR. | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| Energy | | | |
| E.8 | 1. General (energy sector) | The ERT noted some issues with the use of notation keys. For example, in CRF table 1.A(a)s4, the cells for reporting $CO_2$, $CH_4$ and $N_2O$ emissions for category 1.A.5.a (stationary (other)) are blank instead of indicating "NO"; in CRF table 1.A(a)s3, for biomass for light-duty trucks, heavy-duty trucks and buses, and motorcycles, AD are reported as "IE" but emissions are reported as "NO" ("NO" should be corrected to "IE" for emissions); and, in CRF table 1.B.2, AD and emissions for distribution of oil products are reported as "NO" instead of "NA". During the review, the Party confirmed those errors.<br>The ERT recommends that the Party review and correct the use of notation keys for $CO_2$, $CH_4$ and $N_2O$ emissions for category 1.A.5.a (stationary (other)) (reported blank instead of indicating "NO"); in CRF table 1.A(a)s4, for AD and emissions for biomass consumption for light-duty trucks, heavy-duty trucks and buses, and motorcycles (AD are reported as "IE" but emissions as "NO" in CRF table 1.A(a)s3; "NO" should be corrected to "IE"); and, in CRF table 1.B.2, for AD and emissions for distribution of oil products (reported as "NO" but should be reported as "NA"). | Yes. Comparability |
| E.9 | 1.A.1.a Public electricity and | The ERT found that peat consumption peaked in 2007 and 2013 (at 491.00 TJ and 441.00 TJ, respectively) after a surge compared with the previous year (212.7 per cent increase between 2006 and 2007 and 316.0 per cent increase between 2012 and 2013). | Yes. Transparency |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[20]? If yes, classify by type |
|---|---|---|---|
| | heat production – peat – $CO_2$ | During the review, the Party explained that one of the biggest Lithuanian biomass power plants switched to a higher share of peat instead of wood/wood waste in 2007, but this solution was not economically and technically feasible; therefore, this peak happened only in 2007. A similar situation occurred in 2013 only, when heat plants also increased their share of peat combusted.<br><br>The ERT recommends that the Party explain in the NIR the trend in peat consumption, including the peaks in consumption in 2007 and 2013. | |
| E.10 | 1.A.3.a Domestic aviation – liquid fuels – $CO_2$, $CH_4$ and $N_2O$ | For domestic aviation, data reported to IEA on jet kerosene are up to 57 per cent higher than the data in the CRF tables for the period 2000–2008, although quantities are low (e.g. for 2004, IEA data were 9.00 TJ higher (43.00 TJ compared with 34.00 TJ), which is 0.65 kt $CO_2$ eq or 0.00003 per cent of national total GHG emissions excluding LULUCF). During the review, the Party explained that the differences could be due to data extrapolation, data correction and conversion of units, for example when separating military and civil aviation data for 2000–2003.<br><br>The ERT recommends that the Party review the differences between jet kerosene consumption reported to IEA and the estimates in the CRF tables for 2000–2008 and either make the data consistent or explain the reasons for the differences in the NIR. | Yes. Accuracy |
| E.11 | 1.A.3.b.iv Motorcycles – liquid fuels – $CH_4$ | The ERT noted that the $CH_4$ IEF for gasoline (24.57–39.04 kg/TJ) is among the lowest reported by Parties and decreased significantly between 2013 and 2014 (by 21 per cent; the $CH_4$ IEF for 2014 (24.57 kg/TJ) is the lowest in the time series). During the review, the Party explained that, following the implementation of legislation introduced in 2014, the number of all vehicles decreased markedly in 2014 compared with 2013. However, the number of motorcycles increased by 11 per cent in 2014 compared with 2013, even though motorcycles' gasoline consumption and mileage decreased. These changes influenced the algorithm of the model (COPERT IV) used to split fuel by all vehicle categories and led to a decrease in the $CH_4$ IEF.<br><br>The ERT recommends that the Party explain the trend in the $CH_4$ IEF for gasoline consumption in the NIR, including the impact of national legislation on the trend and the low value reported for the $CH_4$ IEF for 2014. | Yes. Transparency |
| E.12 | 1.A.3.d Domestic navigation – liquid fuels – $CO_2$, $CH_4$ and $N_2O$ | For domestic navigation, for 1998 onward, data reported to IEA on gas/diesel oil consumption are up to 15 per cent higher than the data in the CRF tables, although quantities are low (e.g. for 2015, IEA data are 26.00 TJ higher, a difference of approximately 2 kt $CO_2$ eq or 0.01 per cent of national total GHG emissions excluding LULUCF). During the review, the Party explained that the estimates for internal navigation in the CRF tables are based on information provided in the database of Statistics Lithuania (http://www.stat.gov.lt/lt/) and that differences between the CRF data and the IEA data could occur due to conversion of units.<br><br>The ERT recommends that the Party review the differences between gas/diesel oil consumption reported to IEA and the estimates in the CRF tables for 1998 onward and either make the data consistent or explain the reasons for these differences in the NIR. | Yes. Accuracy |
| E.13 | 1.A.4.c.iii Fishing – liquid and other fuels – $CO_2$, $CH_4$ and $N_2O$ | AD and emissions for the subcategory fishing (gas/diesel oil) (1.A.4.C.iii) are reported as "NO" for 1990–2004 and estimated and reported for 2005–2015 (e.g. for 2015, the Party reported 6.00 TJ consumption and $CO_2$, $CH_4$ and $N_2O$ emissions of 0.44 kt, 0.000042 kt and 0.000012 kt, respectively). During the review, the Party explained that data on fuel consumption for this category were provided by Statistics Lithuania for the period 2005–2015 but data for previous years were not available. During the review, the Party explained that Statistics Lithuania suggested that the activity may have occurred since 1990 but data are not available. | Yes. Completeness |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[20] If yes, classify by type |
|---|---|---|---|
| | | The Party indicated that preliminary estimates of emissions for 1990–2004 using extrapolation were calculated at 0.6 kt $CO_2$ eq on average annually for the period 1990–2004, which is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines (9.80–24.99 kt $CO_2$ eq for 1990–2004).<br><br>The ERT recommends that the Party estimate and report $CO_2$, $CH_4$ and $N_2O$ emissions for 1990–2004, or, if the Party considers the emissions insignificant, report them as "NE" and justify that the likely level of emissions is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. | |
| E.14 | 1.B.2.b Natural gas – liquid fuels – $CO_2$ and $CH_4$ | The Party reported that the LNG terminal started operation in Lithuania in January 2015 (NIR p.94). However, in NIR chapter 3.7.3 (fugitive emissions from natural gas), the Party did not provide any information on $CO_2$ and $CH_4$ fugitive emissions related to the LNG terminal, including associated liquefaction and gasification facilities. The ERT noted that fugitive emissions from natural gas activities include all emissions from transportation and distribution and from non-productive combustion. The ERT also noted that the 2006 IPCC guidelines (volume 2, chapter 4, table 4.2.8) provide indicative yearly $CH_4$ EFs for LNG plants (liquefaction or regasification) that may be used to qualify methane losses as low (0.005 per cent of throughput), medium (0.05 per cent) or high (0.1 per cent). The ERT further noted that the 2006 IPCC Guidelines do not provide specific default $CH_4$ EF values for LNG, but that the indicative yearly factors could be used to better assess the accuracy of country-specific EFs. The ERT noted that the 2006 IPCC Guidelines (p.4.70) indicate that reported values appreciably below or above the range provided for indicative yearly factors should be explained in the NIR. During the review, the Party indicated that data on the natural gas throughput via the LNG terminal are available (e.g. the throughput for 2015 equals 14,771 TJ; 16.5 per cent of imported gas; total import 89,642 TJ).<br><br>The ERT encourages the Party to report fugitive $CO_2$ and $CH_4$ emissions from the LNG terminal, including associated liquefaction and gasification facilities. | Not an issue/problem |
| IPPU | | | |
| I.3 | 2. General (IPPU) | The ERT noted that there are some minor errors in the NIR that affect the transparency of the report, as described in the recommendation below. During the review, Lithuania explained that these errors will be addressed for the next submission.<br><br>The ERT recommends that Lithuania correct the errors found in the NIR by removing the reference to NIR table 4-45 in chapter 4.8.3.1, adding a reference to chapter 3.2.6.5 ($CO_2$ emissions from carbonate use in flue gas desulfurization) in NIR chapter 4.9.3 (consumption of carbonates in flue gas desulfurization), and ensuring that consistent number formatting is used in NIR table 3-18. | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| I.4 | 2.A.1 Cement production – $CO_2$ | The Party reported a decrease in clinker production in 2014 compared with 2013 and 2015 (NIR p.222; CRF table 2(I).A-Hs1), namely 753.77 kt in 2014 compared with 854.75 kt and 963.41 kt in 2013 and 2015, respectively. During the review, the Party explained that Portland cement is produced by a single company in Lithuania. Since the opening of the plant, cement has been produced using wet production technology. The construction and installation of a new dry clinker production line was completed at the end of 2013. During the transition of production technologies from wet process to dry, clinker production in the wet line was terminated for some time until the new line was launched, which resulted in the decrease in clinker production observed in | Yes. Transparency |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[20] If yes, classify by type |
|---|---|---|---|
| | | 2014.<br><br>The ERT recommends that the Party explain in the NIR the decrease in clinker production in 2014 compared with 2013 and 2015. | |
| I.5 | 2.A.3 Glass production – $CO_2$ | Lithuania reported an increased $CO_2$ IEF for glass production for the years 2006–2009 in CRF table 2(I).A-Hs1, followed by a decrease in the IEF for 2010: 0.15 t $CO_2$/t in 2005, 0.18 t $CO_2$/t in 2006, 0.19 t $CO_2$/t in 2009 and 0.14 t $CO_2$/t in 2010. During the review, Lithuania explained that the IEF decrease between 2009 and 2010 was due to inconsistent data on cullet use for 2010–2015 provided by the company, and provided the ERT with updated cullet data for this period. The ERT noted that the inconsistent data on cullet use does not affect the emission estimates, which are based on the carbonate input to the glass melting furnace. The ERT also noted that the $CO_2$ IEF would range from 0.16 to 0.18 t $CO_2$/t for 2010–2015 using the updated data.<br><br>The ERT recommends that Lithuania report the correct AD for 2010–2015 in CRF table 2(I).A-Hs1. | Yes. Transparency |
| I.6 | 2.B.1 Ammonia production | Lithuania did not provide information on category-specific QA/QC procedures for ammonia production (NIR p.240). The ERT noted that, according to paragraph 17 of the UNFCCC Annex I inventory reporting guidelines, Parties included in Annex I to the Convention should apply category-specific QC procedures (tier 2) for key categories in accordance with the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. During the review, Lithuania explained that a consistency check of reported emissions in the GHG inventory with EU ETS data is performed every year.<br><br>The ERT encourages Lithuania to provide the outcomes of the category-specific QA/QC activities in its NIR. | Not an issue/problem |
| I.7 | 2.B.1 Ammonia production – $CO_2$ | Lithuania indicated that $CO_2$ recovered for downstream use in urea production is reported in the category in which the urea is used (NIR p.240). This is in line with the 2006 IPCC Guidelines (volume 3, chapter 3.2.2.3, box 3.2: "the quantity of $CO_2$ recovered for downstream use in urea production must be subtracted from the total quantity of $CO_2$ generated to derive $CO_2$ emitted"). During the review, Lithuania provided the ERT with the annual amount of urea produced in the period 1990–2015. Lithuania explained that, in addition to data on urea produced, there are data available on exported urea, urea used in the agriculture sector and urea used in urea-based catalysts. Lithuania also explained that $CO_2$ emissions from exported urea are excluded from the inventory; $CO_2$ emissions from urea used in the agriculture sector are allocated to category 3.H; and $CO_2$ emissions from urea used in urea-based catalysts are allocated to category 2.D.3. Lithuania further explained that the difference between the urea produced and the urea exported or used in agriculture or in urea-based catalysts is allocated to ammonia production (category 2.B.1).<br><br>The ERT recommends that Lithuania explain in the NIR that there is information available only on urea produced, exported, used in the agriculture sector and used in urea-based catalysts and that $CO_2$ emissions from all other uses of urea are allocated to ammonia production.<br><br>The ERT encourages Lithuania to contact the urea production plant to identify all uses of downstream urea and allocate $CO_2$ emissions to the appropriate inventory categories. | Yes. Transparency |
| I.8 | 2.B.1 Ammonia | Lithuania reported an increase in ammonia production between 2006 and 2007 (NIR p.238; CRF table 2(I).A-Hs1) from 551.07 kt in 2006 to 1,137.61 kt in 2007. During the review, Lithuania explained that the increase was caused by a second ammonia | Yes. Transparency |

| *ID#* | *Finding classification* | *Description of the finding with recommendation or encouragement* | *Is finding an issue and or a problem?[a] If yes, classify by type* |
|---|---|---|---|
| | production | production unit starting operation at the end of 2006.<br><br>The ERT recommends that Lithuania explain the increase in ammonia production between 2006 and 2007 in its NIR. | |
| I.9 | 2.B.1 Ammonia production | The ERT considers that it is not clear in the NIR whether emissions from total natural gas consumption are allocated to category 2.B.1 (ammonia production in the IPPU sector) or whether emissions from natural gas consumption used for heat production during ammonia production are reported under category 1.A.2.c (chemicals in the energy sector). The ERT noted that the 2006 IPCC Guidelines (volume 3, chapter 3.2.2) indicate that in the case of ammonia production no distinction is made between fuel and feedstock emissions, with all emissions accounted for in the IPPU sector.<br><br>The ERT recommends that Lithuania clarify in the NIR whether all emissions from natural gas consumption in ammonia production are allocated to category 2.B.1 (ammonia production). | Yes. Transparency |
| I.10 | 2.B.1 Ammonia production – $CO_2$ | The NIR reports a revision of the country-specific $CO_2$ EFs for natural gas as a result of a study (p.240). During the review, Lithuania explained that a mistake was identified in the use of the $CO_2$ EFs for 2013 and 2014. Instead of applying the new EFs from the study (55.21 t/TJ for 2013 and 55.24 t/TJ for 2014), the EF from a previous study was used (55.23 t/TJ for both years). Lithuania provided estimates that confirmed that the effect on estimated $CO_2$ emissions of this oversight (an overestimation of 0.6 kt $CO_2$ eq for 2013 and an underestimation 0.4 kt $CO_2$ eq for 2014) is below the threshold of significance indicated in the UNFCCC Annex I inventory reporting guidelines.<br><br>The ERT recommends that Lithuania use the most up-to-date country-specific $CO_2$ EFs for natural gas. | Yes. Accuracy |
| I.11 | 2.B.1 Ammonia production – $CO_2$ | The NIR reports a revision of the country-specific $CO_2$ EFs for natural gas as a result of a study (p.240). Lithuania reported that an LNG terminal started operation in Lithuania in January 2015 (NIR p.94). The ERT noted that there is only one ammonia production plant in Lithuania. The ERT also noted that the mix between pipeline gas and LNG consumed at this ammonia plant in 2015 may differ from the national average mix (and therefore the $CO_2$ EF for ammonia production may differ from the $CO_2$ EF for natural gas in other categories and that used for ammonia production for previous years). During the review, Lithuania explained that the ammonia production company confirmed that the gas used was only via the pipeline in 2015; thus, the country-specific EF used in the energy sector for 2015 (55.53 t/TJ) would not reflect the composition of natural gas used by the company because it also included the natural gas from the new LNG terminal. Lithuania also explained that, in consultation with its energy sector expert, the $CO_2$ EF for natural gas from a study performed in 2012 (55.23 t/TJ) was used for ammonia production and that the same EF was used in the company's reporting for 2015 to the EU ETS.<br><br>The ERT commends Lithuania for obtaining and using this information for its 2017 submission and recommends that the Party clearly explain the $CO_2$ EF applied for natural gas for ammonia production and the differences from the $CO_2$ EF for natural gas used in other categories in the NIR, particularly for 2015.<br><br>The ERT encourages Lithuania to continue to take into consideration the natural gas mix used by the plant when choosing the EF for this category, for example considering the LNG contract that the ammonia production plant has had since 2016. | Yes. Transparency |
| I.12 | 2.B.1 Ammonia production – | Lithuania reported $SO_2$ emissions from ammonia production as "NA" for all years (CRF table 2(I)s1). The ERT noted that Lithuania reported $SO_2$ emission estimates for ammonia production for 2012–2015 in its submission to the Convention on Long- | Not an |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and or a problem?[a] If yes, classify by type |
|---|---|---|---|
| | $SO_2$ | range Transboundary Air Pollution (available at http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2017_submissions/). During the review, Lithuania explained that this inconsistency would be corrected.<br><br>The ERT encourages Lithuania to run annual QA/QC activities comparing the $SO_2$ emission estimates for this category in the submission to the UNFCCC and the submission to the Convention on Long-range Transboundary Air Pollution to ensure consistency. The ERT also encourages Lithuania to include the missing $SO_2$ emission estimates for ammonia production for 2015. | issue/problem |
| I.13 | 2.D.2 Paraffin wax use – $CO_2$ | Lithuania reported AD and $CO_2$ emissions for paraffin wax use as "NO" for all years prior to 2001 (NIR p.252; CRF table 2(I).A-Hs2). During the review, Lithuania explained that the activity occurred in the period 1990–2000 but data were not available. Lithuania provided preliminary estimates by extrapolating the available AD, which confirmed that the missing emissions are below the threshold of significance indicated in the UNFCCC Annex I inventory reporting guidelines (preliminary estimates indicate emissions of 0.88 kt $CO_2$, below the significance threshold for the Party (10.05 kt $CO_2$ eq)).<br><br>The ERT recommends that Lithuania report AD and $CO_2$ emissions for this category for 1990–2000. | Yes. Completeness |
| I.14 | 2.D.3 Other (non-energy products from fuels and solvent use) – $CO_2$ and NMVOCs | Lithuania reported recalculated $CO_2$ and NMVOC estimates for category 2.D.3 (other) for all years (NIR p.258; CRF table 8s1). The ERT noted that the recalculations result in a step-change in emissions between 2004 and 2005 (for $CO_2$, from 58.32 kt $CO_2$ for 2004 to 37.63 kt $CO_2$ eq for 2005; for NMVOCs, from 26.51 kt to 17.10 kt, respectively). During the review, Lithuania explained that $CO_2$ emissions for the entire time series 1990–2015 were calculated on the basis of emissions of NMVOCs. The Party also explained that NMVOC emissions for 2005 onward were calculated using production and import/export data of coating products, but that those data are not available for 1990–2004 so emissions for that period were calculated using per capita data. Lithuania explained that the use of different calculation methods has caused an inconsistency in the emission trend.<br><br>The ERT recommends that Lithuania address the time-series inconsistency between 1990–2004 and 2005 onward by applying an appropriate technique in accordance with the 2006 IPCC Guidelines (volume 1, chapter 5.3.3) for the years 1990–2004. | Yes. Consistency |
| I.15 | 2.E.1 Integrated circuit or semi-conductor – PFCs and $NF_3$ | Lithuania reported emissions of PFCs and $NF_3$ from the production of semiconductors for 1990–2013 as "NO" and reported no values for 2014 and 2015 (CRF table 2(II)). The ERT noted that these gases can be used during the production of semiconductors. During the review, the Party explained that the relevant company was contacted and confirmed that PFCs and $NF_3$ are not used during the production of semiconductors in Lithuania.<br><br>The ERT recommends that the Party explain in the NIR that no PFC or $NF_3$ emissions occur during the production of semiconductors and report the entire time series as "NO" in the CRF tables. | Yes. Transparency |
| I.16 | 2.F.1 Refrigeration and air conditioning – HFCs and PFCs | The ERT noted that the NIR did not provide information on category-specific QA/QC activities performed for the key category 2.F.1 (refrigeration and air conditioning) (NIR p.284). The ERT noted that, in paragraph 19 of the UNFCCC Annex I inventory reporting guidelines, Parties included in Annex I to the Convention are requested to apply category-specific QC procedures (tier 2) for key categories in accordance with the 2006 IPCC Guidelines. During the review, the Party explained that a comparison of per capita emissions between commercial and industrial refrigeration subcategories (2.F.1.a and 2.F.1.c) was performed and that | Not an issue/problem |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[20] If yes, classify by type |
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| | | this comparison will be included in the next submission. Lithuania also explained that further QA activities were performed in 2016 by EU experts during the review under the EU effort-sharing decision (406/2009/EC).<br><br>The ERT encourages Lithuania to include details of the category-specific QA/QC activities in the NIR and continue to perform such activities taking into consideration whether indicators such as gross value added may be more appropriate than per capita emissions for these subcategories. | |
| I.17 | 2.F.1 Refrigeration and air conditioning – HFCs | Lithuania reported that recovery of fluorinated gases has taken place at the only refrigerator recycling unit in the Baltic countries since 2007 (NIR p.264). The ERT noted that this may indicate that imported units are processed at the facility. During the review, Lithuania explained that refrigerators from other countries are imported and these units are not included in the emission estimates for domestic refrigerator disposal. Lithuania also explained that these estimates will be included in the next submission. Preliminary estimates provided by Lithuania confirmed that the missing emissions are below the threshold of significance (e.g. the preliminary estimate for 2015 is 0.23 kt $CO_2$ eq, while the significance threshold is 9.93–10.05 kt $CO_2$ eq for 2013–2015).<br><br>The ERT recommends that Lithuania either estimate HFC emissions from the disposal of imported refrigerators or justify that the likely level of emissions is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. | Yes. Completeness |
| I.18 | 2.F.1 Refrigeration and air conditioning – HFC-143a | Lithuania reported a decrease in the amount of HFC-143a for the amount of gas "*filled into new manufactured products*" between 2013 and 2014 for subcategory 2.F.1.a (commercial refrigeration) (CRF table 2(II)B-Hs2) from 3.53 t to 2.18 t. During the review, Lithuania explained that one of the largest Lithuanian commercial companies (UAB Palink) opened in 2013 and bought and installed many new refrigerators in 2013 compared with 2014.<br><br>The ERT recommends that Lithuania include in the NIR the explanation for the decrease in the amount of HFC-143a for the amount of gas "filled into new manufactured products" between 2013 and 2014 (from 3.53 t to 2.18 t) for subcategory 2.F.1.a (commercial refrigeration). | Yes. Transparency |
| I.19 | 2.F.3 Fire protection – HFC-23 | Lithuania reported HFC-23 emissions for category (2.F.3) fire protection as "NO" for the entire time series (CRF table 2(II)B-Hs2). The ERT noted that Lithuania reported that small amounts of HFC-23 had been used (NIR p.287). During the review, Lithuania explained that no data on the amount of HFC-23 are available; therefore, to determine the emissions of HFC-23, a preliminary estimate using per capita emission data from neighbouring countries (Estonia and Latvia) was calculated. Estimated data provided by Lithuania confirmed that the missing emissions are below the threshold of significance (e.g. the preliminary estimate for 2014 is 1.04 kt $CO_2$ eq, while the significance threshold for the Party is 9.93–10.05 kt $CO_2$ eq for 2013–2015).<br><br>The ERT recommends that Lithuania either estimate the emissions or, if the Party considers the emissions insignificant, report them as "NE" and justify that the likely level of emissions is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. | Yes. Completeness |
| I.20 | 2.H Other (industrial processes and | Lithuania reported that flue gas desulfurization has been in operation at one power plant since 2008 (NIR p.104; CRF table 2(I).A-Hs2). The ERT noted that $CO_2$ emissions reported under this category change significantly (e.g. $CO_2$ emissions were reported as 0.02 kt $CO_2$ eq for 2011, 3.75 kt $CO_2$ for 2012 and 1.01 kt $CO_2$ eq for 2013). During the review, Lithuania explained | Yes. Comparability. |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and or a problem[m]? If yes, classify by type |
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| | product use) – $CO_2$ | that limestone is used in flue gas desulfurization only when liquid fuel is used, and the quantity of limestone used is directly dependent on the amount of liquid fuel. Lithuania provided liquid fuel AD for 2008 onward, which confirmed the relationship between limestone use and consumption of liquid fuel.<br><br>The ERT recommends that Lithuania include in the NIR a brief explanation of the reason for the fluctuating trend in $CO_2$ emissions from flue gas desulfurization and report all emissions from limestone used in flue gas desulfurization under category 2.A.4.d other (other process uses of carbonates).<br><br>The ERT encourages Lithuania to include the liquid fuel consumption for the power plant in NIR table 3-18. | |
| Agriculture | | | |
| A.17 | 3.A Enteric fermentation – $CH_4$ | The Party reported inconsistent subcategory names for non-dairy cattle (NIR pp.304, 306, 312 and 313; NIR annex VII, table A.5-30), for swine (NIR pp.304 and 312–314; NIR annex VII, pp.133–136, tables A.5-15 to A.5-23) and for sheep (NIR pp.304, 315 and 309; NIR annex VII, pp.136 and 137, tables A.5-24 to A.5-27). For example, "other cattle" was used in NIR tables 5-6 (p.304) and 5-17 (p.312); "dairy cattle for slaughter" was used in NIR tables 5-16 and A.5-30; "sucking cows" was used in NIR tables 5-6, 5-16 and 5-17 and "beef cattle (mature cows)" was used in NIR annex VII, table A.5-30. For sheep, four subcategories are used in some tables (NIR pp.304 and 315; NIR annex VII, pp.136 and 137, tables A.5-24 to A.5-27) but five subcategories are used in NIR table 5-12 (p.309). The ERT noted that the inconsistent livestock subcategories are not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 10.2). During the review, the Party explained that "beef cattle (mature cows)" (table A.5-30) are the same as "sucking cows" (table 5-6), and "dairy cattle for slaughter "(table A.5-30) are the same as "other cows" (table 5-6). For swine, the Party explained that, in the NIR, the "main" category (table 5-10) was divided into "sows mated" and "sows nursing young" (table 5-22); "replacement" was divided into "sows mated" and "sows nursing young" (table 5-22); "boars" (table 5-10) was divided into "mature" and "young for bread"; "gilts for breeding" (table 5-10 and table A.5-23) are the same as "pigs for breed"; and "growing pigs" (table 5-22) includes "growing pigs", "pigs>8 months" (table 5-10) and "piglets>28 days" (table 5-22).<br><br>The ERT recommends that the Party use the same subcategory names for non-dairy cattle, sheep and swine when reporting the AD, parameters, GE and EF calculations in its NIR. | Yes. Transparency |
| A.18 | 3.A.1 Cattle – $CH_4$ | The ERT noted that there are some errors in the average GE intake of dairy cattle reported in the NIR (p.311). For example, NIR table 5-15 indicates that GE was 233.9 MJ/head/day, 215.0 MJ/head/day, 232.2 MJ/head/day, 248.9 MJ/head/day, 267.1 MJ/head/day, 270.7 MJ/head/day, 278.0 MJ/head/day, 280.8 MJ/head/day, 291.6 MJ/head/day and 291.5 MJ/head/day for 1990, 1995, 2000, 2005, 2010, 2011, 2012, 2013, 2014 and 2015, respectively. However, the ERT estimated, using the GE equation (NIR p.310) and the average diet nutrition indicators for dairy cattle (NIR annex VII, pp.129 and 130, table A.5-2), 233.3 MJ/head/day, 214.6 MJ/head/day, 231.8 MJ/head/day, 248.4 MJ/head/day, 265.9 MJ/head/day, 269.3 MJ/head/day, 276.6 MJ/head/day, 279.1 MJ/head/day, 289.4 MJ/head/day and 288.9 MJ/head/day for the same years. During the review, the Party explained that there are some mistakes in the diet nutrition indicators reported in NIR table A.5-2 (NIR annex VII, pp.129 and 130). The Party provided a revised NIR table A.5-2 with correct values for crude fat, crude fibre and N-free extracts for the entire time series used for the GE calculation. The ERT noted that the errors in the NIR did not affect the reported emission estimates. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and or a problem[b]? If yes, classify by type |
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| | | The ERT recommends that the Party report the correct average diet nutrition indicators for dairy cattle in its NIR for all years in the time series. | |
| A.19 | 3.A.1 Cattle – $CH_4$ | The ERT noted that the average GE intake values for bulls up to one year for breed and heifers at two years for slaughter reported in NIR table 5-17 were not consistent with the results calculated by the ERT using the GE equation (NIR p.310) and the average diet nutrition indicators for non-dairy cattle (NIR p.312, table 5-16). For example, the ERT calculated GE as 77.1 MJ/head/day rather than 100.4 MJ/head/day for bulls up to one year for breed and 172.2 MJ/head/day rather than 171.2 MJ/head/day for heifers at two years for slaughter. During the review, the Party explained that there are errors in the average diet indicators reported in NIR table 5-16 (NIR p.312). For bulls up to one year for breed, the nutrition indicator of crude fibre should be 1.290 kg instead of the reported 0.129 kg. For heifers at two years for slaughter, the nutrition indicators of crude protein, crude fat, crude fibre and N-free extracts should be 1.363 kg, 0.316 kg, 2.659 kg and 4.151 kg, respectively, rather than the reported 1.409 kg, 0.317 kg, 2.659 kg and 4.151 kg. The ERT noted that the errors in the NIR did not affect the reported emission estimates. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |
| | | The ERT recommends that the Party correct the values of the nutrition indicators for non-dairy cattle reported in NIR table 5-17. | |
| A.20 | 3.A.1 Cattle – $CH_4$ | The Party reported inconsistent EFs for non-dairy cattle in NIR table 5-20 (p.313) and CRF table 3.As1 for the entire time series. For example, the EF for non-dairy cattle in the NIR was 53.46 kg $CH_4$/head/year, 50.14 kg $CH_4$/head/year, 48.10 kg $CH_4$/head/year, 48.23 kg $CH_4$/head/year, 51.12 kg $CH_4$/head/year, 51.08 kg $CH_4$/head/year, 51.52 kg $CH_4$/head/year, 51.31 kg $CH_4$/head/year, 51.40 kg $CH_4$/head/year and 51.28 kg $CH_4$/head/year for 1990, 1995, 2000, 2005, 2010, 2011, 2012, 2013, 2014 and 2015, respectively, while the values reported in CRF table 3.As1 were 52.82 kg $CH_4$/head/year, 51.63 kg $CH_4$/head/year, 49.73 kg $CH_4$/head/year, 49.49 kg $CH_4$/head/year, 52.17 kg $CH_4$/head/year, 51.97 kg $CH_4$/head/year, 51.79 kg $CH_4$/head/year, 52.92 kg $CH_4$/head/year, 54.34 kg $CH_4$/head/year and 55.54 kg $CH_4$/head/year for the same years. During the review, the Party explained that the EFs for non-dairy cattle in NIR table 5-20 (NIR p.313) had not been updated and that the correct values are those reported in CRF table 3As1. The ERT noted that the errors in the NIR did not affect the reported emission estimates. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |
| | | The ERT recommends that the Party report consistent $CH_4$ EFs for non-dairy cattle in the NIR and in CRF table 3.As1. | |
| A.21 | 3.A.2 Sheep – $CH_4$ and $N_2O$ | The Party reported inconsistent sheep populations in NIR tables 5-3 (p.303) and 5-12 (p.309) for the entire time series. For example, the sheep population in 2015 was reported as 154,500 heads in NIR table 5-3 but 169,300 heads (the sum of all categories) in NIR table 5-12. The ERT noted that the difference in the sheep populations reported in the two tables was 9.6 per cent. During the review, the Party explained that there was double counting in NIR table 5-12. The column "Ewe over 1 year" contains two different populations, ewes over one year and rams over one year, although in NIR table 5-12 the population of rams over one year was reported separately. The ERT noted that the errors in the NIR did not affect the reported emission estimates. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |
| | | The ERT recommends that the Party correct the inconsistencies in the reporting of the sheep population (e.g. 154,500 heads for 2015 reported in NIR table 5-3 but 169,300 heads (the sum of all categories) in NIR table 5-12) and report a consistent and correct sheep population in all NIR tables. | |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[b]? If yes, classify by type |
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| A.22 | 3.A.2 Sheep – $CH_4$ | The Party reported inconsistent values for average diet nutrition indicators (NIR p.315, table 5-24), GE and EFs for sheep (NIR p.315, table 5-25), as identified when the ERT tried to replicate the calculations using NIR tables A.5-24 to A.5-27 (NIR annex VII, pp.136 and 137). During the review, the Party explained that NIR tables 5-24 (NIR p.315), 5-25, A.5-24, A.5-25 and A.5-27 include some incorrect values but that the correct values were used in the calculations of the emissions reported. The ERT noted that the errors in the NIR did not affect the reported emission estimates.<br><br>The ERT recommends that the Party correct the inconsistencies in the average diet nutrition indicators (NIR p.315, table 5-24), GE and EFs for sheep (NIR p.315, table 5-25) so that the calculations can be replicated, and report, in its NIR, correct and consistent values for the average diet nutrition indicators (crude protein, crude fat, crude fibre, N-free extracts and dm), GE and consumption of each feedstuff for all sheep subcategories. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |
| A.23 | 3.A.3 Swine – $CH_4$ | The Party reported an inconsistent swine population for 2013 (NIR p.303, table 5-3; NIR p.308, table 5-10). For example, the ERT noted that the sow (replacement) population of 88,000 heads in 2013 reported in NIR table 5-10 was much higher than for other years (e.g. 9,800 heads in 2012 and 8,000 heads in 2014). The total swine population in 2013 reported in NIR table 5-10 was 10.2 per cent higher than that reported in table 5-3. During the review, the Party explained that the population of sows (replacement) in 2013 in NIR table 5-10 is incorrect and that the correct number of sows should be 8,800 heads. The ERT noted that the errors in the NIR did not affect th · reported emission estimates.<br><br>The ERT recommends that the Party correct the inconsistency identified for the swine population in NIR tables 5-3 and 5-10 (e.g. the sow (replacement) population of 88,000 heads in 2013 reported in NIR table 5-10 was much higher than for other years (e.g. 9,800 heads in 2012 and 8,000 heads in 2014); and the total swine population in 2013 reported in NIR table 5-10 was 10.2 per cent higher than that in table 5-3) and ensure the consistency of the swine population reported in different NIR tables. | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |
| A.24 | 3.A.3 Swine – $CH_4$ | The ERT estimated average GE intake using the average diet nutrition indicators (NIR pp.313 and 314) and data from NIR tables A.5-15 to A.5-23 (NIR annex VII, pp.133–136), but the estimations did not match the values for GE intake reported in NIR table 5-22 (NIR p.314) for swine. During the review, the Party explained that some mistakes were identified in NIR tables A.5-15, A.5-17 to A.5-20, A.5-22 and A.5-23 and provided the correct values. For example, NIR tables A.5-17 to A.5-20 and tables A.5-22 to A.5-23 reported a value of 999 g/kg for dm of oil but the correct value is 0 g/kg, and NIR table A.5-20 reported values of 0.47 kg/day, 0.09 kg/day, 0.59 kg/day, 0.28 kg/day, 0.12 kg/day, 0.06 kg/day and 0.02 kg/day for consumption of barley, wheat, triticale, leguminous plants, rapeseed cake, soybean meal and milk substitutes, respectively, but the correct values are 0.58 kg/day, 0.34 kg/day, 0.45 kg/day, 0.27 kg/day, 0.11 kg/day, 0.11 kg/day and 0.03 kg/day, respectively. The ERT noted that the errors in the NIR did not affect the reported emission estimates.<br><br>The ERT recommends that the Party correct the values in NIR tables A.5-15, A.5-17 to A.5-20, A.5-22 and A.5-23 for crude protein, crude fat, crude fibre, N-free extraction, dm, GE and consumption of each feedstuff for all swine subcategories (e.g. NIR tables A.5-17 to A.5-20 and tables A.5-22 to A.5-23 reported a value of 999 g/kg for dm of oil but the correct value is 0 g/kg, and NIR table A.5-20 reported values of 0.47 kg/day, 0.09 kg/day, 0.59 kg/day, 0.28 kg/day, 0.12 kg/day, 0.06 kg/day and 0.02 kg/day for consumption of barley, wheat, triticale, leguminous plans, rapeseed cake, soybean meal and milk substitutes, respectively, but the correct values are 0.58 kg/day, 0.34 kg/day, 0.45 kg/day, 0.27 kg/day, 0.11 kg/day, 0.11 kg/day and 0.03 kg/day, respectively). | Yes. Adherence to the UNFCCC Annex I inventory reporting Guidelines |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem? If yes, classify by type |
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| A.25 | 3.A.3 Swine – $CH_4$ | The Party did not report the source of the Ym value for swine (NIR p.309). During the review, the Party explained that the 2006 IPCC Guidelines do not provide a Ym for swine. Therefore, the Ym value for swine provided in the Revised 1996 IPCC Guidelines (0.6 per cent) (volume 3, p.4.35, table A-4) was used.<br><br>The ERT recommends that the Party report the source of the Ym for swine in its NIR. | Yes. Transparency |
| A.26 | 3.B Manure management – $N_2O$ | The Party reported the same $N_2O$ EF (0.005 kg $N_2O$-N/kg N excreted) for solid storage and dry lot manure management (NIR p.335, table 5-47). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 10, table 10.21) because the IPCC default $N_2O$ EF for solid storage is 0.005 kg $N_2O$-N/kg N excreted and the IPCC default $N_2O$ EF for dry lot is 0.02 kg $N_2O$-N/kg N excreted. During the review, the Party explained that dry lot does not occur in the country and that, for the estimation of $N_2O$ emissions from solid storage manure management systems, an EF of 0.005 kg $N_2O$-N/kg N excreted was used.<br><br>The ERT recommends that the Party, in the NIR, remove all reference to the $N_2O$ EF reported for dry lot and explain that management of manure in dry lots does not occur in the country. | Yes. Transparency |
| A.27 | 3.D.a.3 Crop residues – $N_2O$ | The ERT noted that the Party was not able to estimate the amount of N in bedding material separately and that the N that should be reported as bedding material (under category 3.D.a.2) is included in the estimations for category 3.D.a.3 (see ID# A.12 in table 3).<br><br>The ERT recommends that the Party conduct a survey to obtain data on N in bedding to improve the allocation of the estimates reported under categories 3.D.a.2 and 3.D.a.3. | Yes. Comparability |
| A.28 | 3.D.a.3 Crop residues – $N_2O$ | The ERT noted that the calculation of $N_2O$ emissions from crop residues was not transparent. AD such as total harvested product dm, total above-ground residues dm, total below-ground residues dm, total N content in above-ground residues and total N content in below-ground residues were not reported in the NIR. During the review, the Party provided the AD.<br><br>The ERT recommends that Lithuania provide the AD used for calculating the annual amount of N in crop residues (above and below ground), including N-fixing crops, and from forage/pasture renewal, returned to soils. | Yes. Transparency |
| A.29 | 3.D.a.3 Crop residues – $N_2O$ | The ERT noted several mistakes in the calculation of $N_2O$ emissions from crop residues: the ratio of below-ground residues to harvested yield of crop has been omitted in the calculation for annual, perennial grasses and meadows, and an incorrect value of $Frac_{RENEW}$ was used for mixed dried pulses (0.2 instead of 1). During the review, the Party acknowledged these errors and provided preliminary estimates with the correct parameters, showing that emissions in the years 2013–2015 increased by 1.3 kt $CO_2$ eq. The ERT agreed with the revised estimates and noted that the underestimation is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines (9.93–10.05 kt $CO_2$ eq for 2013–2015 for the Party).<br><br>The ERT recommends that the Party include the ratio of below-ground residues to harvested yield of crop in the calculations for annual, perennial grasses and meadows and correct the value of $Frac_{RENEW}$ for mixed dried pulses (1), provide revised estimates in the next annual submission and report the correct parameters in the NIR. | Yes. Accuracy |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[20] If yes, classify by type |
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| LULUCF | | | |
| L.9 | 4. General (LULUCF) | The Party has included in the NIR several tables with data and information to facilitate the assessment of the AD and EFs applied in the estimations (e.g. NIR tables 6-18 to 6-26). The ERT could not reproduce some of the estimates provided in the CRF tables and requested the Party to provide the relevant calculation sheets. During the review, Lithuania provided the ERT with information that facilitated understanding the estimates provided in the CRF tables.<br><br>The ERT commends the Party for providing the calculation sheets and for the detailed information therein. | Not an issue/problem |
| L.10 | 4. General (LULUCF) | The Party provided in the NIR information related to the methodology applied and AD and EFs used in the estimations for the LULUCF sector. Lithuania noted modifications applied to some of the equations and parameter definitions from the 2006 IPCC Guidelines (e.g. a modified equation 2.8 from the 2006 IPCC Guidelines, volume 4, chapter 2, as reported in the NIR pp.408 and 409). The ERT noted that Lithuania did not justify in the NIR the use of modified equations, which reduced transparency for some calculations. For example, in the slightly modified IPCC equation 2.8, the area of forest land remaining forest land is not clearly presented. During the review, Lithuania indicated that the lack of clarity raised by the ERT will be addressed for the next submission.<br><br>The ERT recommends that Lithuania justify the modification of equation 2.8 from the 2006 IPCC Guidelines and, when modifying any equation from the 2006 IPCC Guidelines, provide transparent information regarding the reasons for doing so. | Yes. Transparency |
| L.11 | Land Representation | The Party provided detailed information in the NIR on how it tracks land-use changes in its territory, following approach 3 and method 2 from the 2006 IPCC Guidelines, thus ensuring that these changes are tracked in a spatially explicit manner (NIR p.557). Lithuania reported that data on all land uses and land-use changes are based on direct annual field measurements performed by the National Forest Inventory since 2012 (NIR p.372), covering not only forest land but all other land-use categories in the entire territory (NIR p.371). To harmonize the data sources, particularly regarding the land-use definitions, and thus ensure a consistent time series, two studies were performed: the first study identified and quantified areas related to LULUCF activities in the period 1990–2011 for forest land, and the other covered all other land-use categories for the same period. By implementing these studies, Lithuania could identify land-use areas and monitor changes for the entire time series from 1990 (NIR p.372). The ERT noted the significant efforts made by Lithuania to construct a consistent land-use representation that allows tracking land-use changes in a more accurate and transparent way. The ERT commends Lithuania for the improvement. | Not an issue/problem |
| L.12 | Land representation | The Party reported inconsistent figures for the total country area in the NIR (p.373) and in CRF table NIR 2. For example, for 2012 the Party reported 6,530.00 kha in CRF table NIR 2, but the NIR (p.373) indicates 6,528.65 kha. During the review, the Party explained that the total country area was taken from statistical information from the National Land Service, which, in 2012, indicated a total area of 6,530,023 ha. However, in 2017, the area, according to the National Land Service, was adjusted to 6,528.65 kha. Lithuania indicated that this inconsistency will be addressed for the next submission. The ERT noted that changing the land area may affect the Party's estimates of emissions and removals.<br><br>The ERT recommends that the Party ensure that the NIR and the CRF tables reflect the same total area throughout the time series | Yes. Accuracy |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[a]? If yes, classify by type |
|---|---|---|---|
| | | (in the 2017 submission, the Party reported 6,530.00 kha for 2012 in CRF table NIR 2, but the NIR (p.373) indicated 6,528.65 kha) and recalculate the estimates of emissions and removals where necessary. | |
| L.13 | 4.A.1 Forest land remaining forest land – $CO_2$ | Lithuania reported net CSC in mineral soils as "NO" in CRF table 4.A. In the NIR (p.413) the Party reported that there are no sufficient and reliable data on drained mineral forest soils collected in Lithuania, and hence no emissions or removals were estimated. The ERT noted that the 2006 IPCC Guidelines recognize the incomplete scientific basis and resulting uncertainty for estimated CSC in mineral soils due to management and assume, in a tier 1 method, that forest soil carbon stocks do not change with management (volume 4, chapter 4.2.3.1).<br><br>The ERT recommends that the Party report net CSC in mineral soils as "NA" and explain in the NIR that "NA" is used because the Party is using a tier 1 method that assumes that carbon stocks do not change. | Yes. Transparency |
| L.14 | 4.B.2 Land converted to cropland – $CO_2$ | The Party reported the annual increase in carbon stocks in biomass due to growth ("gains" in CRF table 4.B) for land converted to cropland using the notation key "NO" in CRF table 4.B. The NIR (p.438) indicates that Lithuania assumes that gains are zero immediately after conversion. The ERT noted that land converted to perennial cropland can accumulate biomass during its maturity cycle. The 2006 IPCC Guidelines indicate, for temperate climate regions, an annual average accumulation rate of 2.1 t C/ha/year and a maturity cycle of 30 years as the default (volume 4, chapter 5.2.1.2, table 5.1). During the review, the Party explained that the annual increment of carbon stock due to biomass growth is applied to all perennial cropland, except for the area where perennial crops are harvested (i.e. they have reached 30 years) and carbon loss is reported (63 t C/ha), because Lithuania has no data available to reliably allocate the new perennial cropland to cropland or another land-use category.<br><br>The ERT recommends that the Party explain, in the NIR, that the annual increment of carbon stock due to biomass growth is applied to all perennial cropland except for the area where perennial crops are harvested and carbon loss is reported. | Yes. Transparency |
| L.15 | 4.C.2 Land converted to grassland – $CO_2$ | The Party reported the use of a default biomass value of 2.4 t dm/ha for the biomass stocks in cropland (NIR p.450; CRF table 4.C). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines because, for cropland containing annual crops, the 2006 IPCC Guidelines indicate a default of 4.7 t C/ha or 10 t dm/ha (p.6.27, section 6.3.1.2) and, for cropland containing perennial crops, the suggested default value is 63 t C/ha (p.5.9, table 5.1). During the review, the Party explained that it will recalculate the CSC in living biomass for land converted to grassland using the appropriate values of biomass stocks for the land-use type prior to conversion.<br><br>The ERT recommends that the Party apply the correct values of carbon stock for cropland (for cropland containing annual crops, the 2006 IPCC Guidelines indicates a default of 4.7 t C/ha or 10 t dm/ha (p.6.27, section 6.3.1.2) and, for cropland containing perennial crops, the suggested default value is 63 t C/ha (p.5.9, table 5.1)) before conversion to other land uses to avoid underestimating the net emissions. | Yes. Accuracy |
| L.16 | 4.C.2 Land converted to grassland – $CO_2$ | The Party reported that the annual change in biomass of grassland vegetation is 2.4 t dm/ha (NIR p.450; CRF table 4.C). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 6.3.1.2, table 6.4) because the value in the guidelines (2.4 t dm/ha) relates to an annual change not in the above-ground biomass in grassland after conversion but in the peak above-ground biomass. The 2006 IPCC Guidelines also provide the total non-woody biomass that the Party may | Yes. Accuracy |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] If yes, classify by type |
|---|---|---|---|
| | | consider (13.6 t dm/ha), which should be applied only once after the conversion. During the review, the Party explained that it will recalculate the changes in carbon stock in living biomass due to conversion to grassland for its next submission.<br><br>The ERT recommends that the Party revise the calculation of the changes in carbon stock in living biomass from land converted to grassland to ensure that the total carbon stock in living biomass per ha does not exceed the peak value for grassland provided in table 6.4 of the 2006 IPCC Guidelines (2.4 t dm/ha). | |
| L.17 | 4.C.2.2 Cropland converted to grassland | The Party reported that the fraction of organic soils in the total cropland area is 0.7 per cent (NIR p.435) and that organic soils constitute 10.5 per cent of the total grassland area and of the total area of land converted to grassland (NIR p.447). However, the ERT noted that the NIR (p.451) indicates 0.7 per cent as the share of organic soils in the total area of cropland converted to grassland, which is inconsistent with the percentage indicated for this conversion in the NIR (p.447). During the review, the Party explained that the value was incorrectly presented in the NIR but the actual estimations used the correct percentage (0.7 per cent).<br><br>The ERT recommends that Lithuania correct the fraction of organic soils in land converted to cropland (0.7 per cent instead of 10.5 per cent) reported in its NIR. | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| L.18 | 4.E.2 Land converted to settlements – $CO_2$ | The Party reported that $B_{BEFORE}$ is assumed to be 2.4 t dm/ha for cropland, grassland and wetlands and 0.0 t dm/ha for other land (NIR p.466; CRF table 4.E). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 6.3.1.2) because the default values for above-ground biomass carbon stock at harvest for cropland containing woody perennial crops in temperate climate regions are 63 t C/ha and 4.7 t C/ha for cropland containing annual crops. For grassland converted to settlements, the ERT noted that Lithuania could apply the default value in table 6.4 of the 2006 IPCC Guidelines, thus ensuring consistency with the value used when land is converted to grassland (2.4 t dm/ha if only above-ground biomass is considered or 13.6 t dm/ha if above- and below-ground (i.e. living) biomass are considered). During the review, the Party explained that the value of 2.4 t dm/ha was wrongly applied and that recalculations will be carried out for the next submission.<br><br>The ERT recommends that the Party use above-ground biomass and/or living biomass carbon stocks in accordance with the 2006 IPCC Guidelines when estimating CSC in biomass for conversions from cropland, grassland, wetlands and other land to settlements. | Yes. Accuracy |
| L.19 | 4.E.2 Land converted to settlements – $CO_2$ | The ERT noted the carbon stock values for the land-use categories prior to conversion reported by the Party (see ID# L.18 above).<br><br>The ERT recommends that the Party review and, if necessary, revise the values of assumed carbon stocks for the land-use categories cropland and grassland prior to conversion for all conversions from cropland and grassland reported to ensure that the estimates of CSC are not underestimated and are in accordance with the 2006 IPCC Guidelines. | Yes. Accuracy |
| L.20 | 4.G HWP – $CO_2$ | The Party reported inconsistent figures in CRF table 10s1 and NIR table 6.8 (p.386) for HWP (category 4.G). For example, NIR table 6.8 indicates –95.65 kt $CO_2$ eq, –604.27 kt $CO_2$ eq, –40.85 kt $CO_2$ eq, –887.01 kt $CO_2$ eq, –872.11 kt $CO_2$ eq, –1,046.42 kt $CO_2$ eq, –932.97 kt $CO_2$ eq, –955.24 kt $CO_2$ eq, –1,399.35 kt $CO_2$ eq and –1,680.86 kt $CO_2$ eq for 1990, 1995, 2000, 2005, 2010, 2011, 2012, 2013, 2014 and 2015, respectively, but CRF table 10s1 indicates –252.55 kt $CO_2$ eq, –830.06 kt $CO_2$ eq, | Yes. Adherence to the UNFCCC Annex I inventory reporting |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] If yes, classify by type |
|---|---|---|---|
| | | −1,268.83 kt $CO_2$ eq, −1,209.53 kt $CO_2$ eq, −1,317.45 kt $CO_2$ eq, −1,471.49 kt $CO_2$ eq, −1,233.46 kt $CO_2$ eq, −1,426.19 kt $CO_2$ eq, −1,429.82 kt $CO_2$ eq and −1,289.53 kt $CO_2$ eq for the same years. During the review, the Party explained that the inconsistencies were due to a recalculation of CSC in HWP due to the incorrect use of approach A instead of approach B and that the correct values are those in the CRF tables. The Party indicated that the incorrect estimates of GHG emissions from HWP in NIR table 6.8 will be corrected for the next submission.<br><br>The ERT recommends that the Party ensure the consistency of the values reported for emissions and removals from HWP presented in the NIR and in CRF table 10s1, as inconsistency might reflect problems with the QA/QC system. | guidelines |
| L.21 | 4(II) Emissions and removals from drainage, rewetting, and other management of organic/mineral soils – $N_2O$ | The Party provided in the NIR the equation used to estimate direct $N_2O$ emissions from managed soils (drained organic forest soils) (NIR p.412; CRF table 4(II)) disaggregated by nutrient-rich and nutrient-poor soils. The ERT noted that the equation provided by the Party included a factor of $10^{-6}$ but all other parameters in the equation are in kg, as indicated in the explanation of the parameters in the NIR. The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 11.2.1.1). During the review, the Party explained that the term $10^{-6}$ was included in the equation to estimate the emissions in kt of $N_2O$ from kg of $N_2O$, but the units provided in the definition of the parameters were incorrect. The Party also explained that the estimates reported in the CRF tables are correct.<br><br>The ERT recommends that the Party correct the information about the equation, parameters and units used to estimate $N_2O$ emissions for this category and explain in the NIR any change made to the equation provided in the 2006 IPCC Guidelines. | Yes. Transparency |
| L.22 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $N_2O$ | The NIR (p.412) reports 0.6 kg $N_2O$-N/kg N as the $N_2O$ EF for temperate, organic, nutrient-poor forest soil. However, the 2006 IPCC Guidelines (volume 4, chapter 11, table 11.1) indicate an EF of 0.1 kg $N_2O$-N/kg N. During the review, the Party acknowledged that the EF reported in the NIR is incorrect and that the IPCC EF had been used in the estimations.<br><br>The ERT recommends that the Party present in the NIR the correct EF for temperate, organic, nutrient-poor forest soil (0.1 kg $N_2O$-N/kg N from the 2006 IPCC Guidelines (volume 4, chapter 11, table 11.1) instead of 0.6 kg $N_2O$-N/kg N currently reported in the NIR (p.412). | Yes. Transparency |
| L.23 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $CO_2$ | The Party reported $CO_2$ emissions from drained organic soils for forest land, cropland and grassland in CRF table 4(II). However, the Party reported CSC in organic soils for forest land, cropland and grassland as "IE" in CRF tables 4.A, 4.B and 4.C, and did not indicate in the NIR or the CRF tables where the emissions reported as "IE" were reported. During the review, the Party explained that the emissions were reported in CRF table 4(II).<br><br>The ERT recommends that the Party estimate and report carbon stocks in organic soils for forest land, cropland and grassland in CRF tables 4.A, 4.B and 4.C, respectively. If the Party reports net CSC in organic soils as "IE" in CRF tables 4.A, 4.B and 4.C, the ERT recommends that the Party explain in the NIR where the CSC in drained organic soils for forest land, cropland and grassland is reported. | Yes. Comparability |
| L.24 | 4(V) Biomass burning | The Party reported the use of the default values from the 2006 IPCC Guidelines (volume 4, chapter 2, table 2.4 (4.1 t dm/ha) and table 2.6 (0.86 t dm/ha)) for the mass of fuel available for combustion and the combustion factor, respectively, to estimate non- | Yes. Accuracy |

| ID[a] | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and or a problem?[29] If yes, classify by type |
|---|---|---|---|
| | (grassland remaining grassland) – $CH_4$ and $N_2O$ | $CO_2$ emissions from wildfires (equation 2.27) (NIR p.448; CRF table 4(V)). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (volume 4, chapter 2.4, table 2.4) because the default value in table 2.4 of the 2006 IPCC Guidelines provides an estimate of the product of the mass of fuel available for combustion and the combustion factor, so that individual values for these parameters do not need to be used and, if used, will lead to an underestimation of emissions. During the review, the Party informed the ERT that it will recalculate and submit corrected estimates of emissions from biomass burning for grassland for its next submission.<br><br>The ERT recommends that the Party use the appropriate values in equation 2.27 (2006 IPCC Guidelines, volume 4, chapter 4) to estimate $CH_4$ and $N_2O$ emissions from wildfires. | |
| Waste | | | |
| W.2 | 5.C.1 Waste incineration – $CO_2$, $CH_4$ and $N_2O$ | The Party reported that the combined uncertainty for $CH_4$ and $N_2O$ emissions from waste incineration without energy recovery is 72 per cent. For $CO_2$ emissions, the evaluated uncertainty is 106 per cent. The Party stated in the NIR that category-specific improvements are not planned (NIR p.527; CRF table 5.C). The ERT noted that the uncertainty value reported by the Party is considerably higher than the IPCC default range (10–50 per cent for AD and 40 per cent for the $CO_2$ EF, from chapters 5.7.1 and 5.7.2). During the review, the Party explained that the reduction of uncertainty is possible only by direct measurement or monitoring of emissions of $N_2O$ and $CH_4$. However, bearing in mind that emissions are far below key category limits and that monitoring equipment is very expensive, installation of monitoring equipment at waste incineration facilities without energy recovery is not planned.<br><br>The ERT encourages the Party to adopt, or include in the inventory improvement plan, procedures or methodologies that can lead to lower uncertainties and increase the accuracy of the estimations, such as surveys at plants to obtain more specific data on waste composition being incinerated, as suggested in the 2006 IPCC Guidelines (volume 5, chapters 5.71 and 5.7.2). | Not an issue/problem |
| W.3 | 5.C.1 Waste incineration – $N_2O$ | The Party reported that, for calculating $N_2O$ emissions from waste incineration, it used the equation from the 2006 IPCC Guidelines (NIR p.526; CRF table 5.C). However, the ERT noted that the equation reported in the NIR for $N_2O$ emissions is incorrect because it indicates $CH_4$ emissions.<br><br>The ERT recommends that the Party correct in the NIR (chapter 7.4.2) the error in the equation used to estimate $N_2O$ emissions from waste incinerated by correcting the reference from $CH_4$ to $N_2O$ emissions. | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| W.4 | 5.C.1 Waste incineration – indirect gases | The Party reported the estimation of indirect gases from waste incineration (nitrogen oxides, carbon monoxide, $SO_2$ and NMVOCs) in CRF table 5. The ERT noted that the Party did not describe the calculations in NIR chapter 9. During the review, the Party explained that it did not include any documentation regarding the calculation of indirect emissions specifically from waste incineration as it is an insignificant source of emissions.<br><br>The ERT encourages the Party to increase the transparency of the NIR by documenting the calculation of the emissions in chapter 9 of the NIR or providing a link to other documentation (e.g. the informative inventory report, available at http://oras.gamta.lt/files/NIR_20170317.pdf). | Not an issue/problem |

| *ID#* | *Finding classification* | *Description of the finding with recommendation or encouragement* | *Is finding an issue and/or a problem[20] If yes, classify by type* |
|---|---|---|---|
| W.5 | 5.D.2 Industrial wastewater – $CH_4$ | The Party reported that most industrial wastewater is discharged into municipal sewerage networks and cannot be separated from municipal wastewater, and the discharge from these industries has already been accounted for in emissions from municipal wastewater (NIR p.529; CRF table 5.D). The Party reported these emissions as "IE" in CRF table 5.D. The ERT also noted that the percentage of emissions from industry included in the emissions from domestic wastewater is not reported in the NIR.<br><br>During the review, the Party explained that separation of industrial and municipal wastewater streams in this case is not necessary, as most industrial wastewater is discharged together with municipal wastewater, and there are no data available for splitting the municipal and industrial components. The Party also explained that industrial BOD discharge most probably comprises about 68 per cent of the domestic BOD generated by the population connected to the sewerage network or 41 per cent of the BOD generated by the total population.<br><br>The Party noted that there is no specific requirement in the 2006 IPCC Guidelines (e.g. volume 5, chapter 6) to separate emissions from municipal and industrial wastewater. On the contrary, the 2006 IPCC Guidelines state that municipal wastewater is a mix of household, commercial and non-hazardous industrial wastewater, treated at wastewater treatment plants (chapter 6.1, p.6.6, footnote), and that industrial wastewater may be treated on site or released into domestic sewer systems; if it is released into the domestic sewer system, the emissions are to be included with the domestic wastewater emissions (chapter 6.2.3, p.6.18). Therefore, as most industrial wastewater in Lithuania is discharged to municipal treatment facilities, emissions from industrial wastewater were not separated from, but included with, the domestic wastewater emissions, as recommended in the 2006 IPCC Guidelines.<br><br>The Party noted that the 2006 IPCC Guidelines state that the most accurate estimates of emissions would be based on measured data from point sources (volume 5, chapter 6.2.3.1, p.6.20). The Party explained that it has measured data from more than 1,000 point sources and that these data were used to calculate the emissions. The Party considers that these measured data are more accurate than estimates based on IPCC equation 6.6 and default parameters from the examples of industrial wastewater data provided in the 2006 IPCC Guideline (volume 5, chapter 6.2.3.3, p.6.22, table 6.9). The Party noted that the upper values of the wastewater generation and chemical oxygen demand load ranges provided in IPCC table 6.9 are in some cases 10 times higher than the lower values; hence, the accuracy of results based on such data is not comparable with the results-based measurements at point sources that the Party has performed (see NIR chapter 7.5.4, p.537, for the results of the comparison).<br><br>The Party estimated the percentage of emissions from industrial wastewater as the difference between the total wastewater emissions and emissions from domestic wastewater calculated using equation 6.3 and the default BOD value (60 g/person/day) from table 6.4 of the 2006 IPCC Guidelines (volume 5, chapter 6.2.2.3, p.6.13). As noted above, the total wastewater emissions are based on measured data from point sources, and data for calculating emissions from domestic wastewater (table 6.4) are more reliable than the parameters for evaluating industrial wastewater emissions provided in table 6.9 of the 2006 IPCC Guidelines. | Not an issue/problem |
| KP-LULUCF | | | |
| KL.1 | AR – $CO_2$ | The Party reported using equation 2.16 from the 2006 IPCC Guidelines to estimate the annual change in carbon stocks in living biomass due to conversion to forest land (NIR p.577). The ERT noted that this equation requires $B_{BEFORE}$ and that Lithuania has | Yes. Accuracy |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem[a]? If yes, classify by type |
|---|---|---|---|
| | | not used the appropriate default values indicated in the 2006 IPCC Guidelines (volume 4, chapter 6.3.1.2, provides values for cropland containing woody perennial crops and for cropland containing annual crops, while table 6.4 provides biomass stocks for grassland; for the values used by the Party and the values indicated in the IPCC Guidelines, see ID# L.18 above). The ERT also noted that the estimate of $B_{BEFORE}$ was based on a modelled curve (NIR figure 6-28) and was assumed to be zero. This curve, however, shows data on the growing stock volume of AR areas for different times since conversion and hence should be used for $B_{AFTER}$. During the review, the Party explained that the correct values for $B_{BEFORE}$ and $B_{AFTER}$ will be used for the next submission.<br>The ERT recommends that the Party ensure the use of correct values of $B_{BEFORE}$ by using values for biomass stocks immediately before conversion, in accordance with the 2006 IPCC Guidelines, since the values used in the 2017 submission could lead to an underestimation of $CO_2$ emissions from AR.<br>The ERT also recommends that the Party use values for $B_{AFTER}$ in accordance with the country-specific curve for growing stock volumes. | |
| KL.2 | AR | The Party reported inconsistent values for areas of AR for 2014 and 2015 in NIR tables 11.11 and 11.12 (39.74 kha and 42.32 kha, respectively) (pp.581 and 584) and CRF table NIR.2 (41.11 kha and 44.59 kha, respectively). During the review, the Party explained that the correct values are those reported in CRF table NIR.2 and that the values in NIR tables 11.11 and 11.12 will be revised for the next submission.<br>The ERT recommends that the Party report correct areas for AR for 2014 and 2015 in the NIR and ensure consistency between the areas of AR provided in the NIR and the CRF tables. | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| KL.3 | FM – $CO_2$ | The Party modified equation 2.17 of the 2006 IPCC Guidelines to estimate CSC in dead organic matter under FM (NIR p.583; CRF table 4(KP-I)B.1). The ERT noted that the equation provided to estimate CSC in dead organic matter did not include CSC in litter, only in deadwood. During the review, the Party acknowledged that CSC in litter was missing from the estimates and explained that the modified equation 2.17 will be corrected for the next submission to include CSC in litter for areas of natural forest expansion.<br>The ERT recommends that the Party revise the estimates for CSC in dead organic matter to include CSC in litter and report information thereon in the NIR. | Yes. Completeness |

[a] Recommendations made by the ERT during the review are related to issues defined in paragraph 81 of the UNFCCC review guidelines or problems defined in paragraph 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.

## VI. Application of adjustments

10. The ERT has not identified the need to apply any adjustments to the 2017 annual submission of Lithuania.

## VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

11. Lithuania has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable for the 2017 review.

## VIII. Questions of implementation

12. No questions of implementation were identified by the ERT during the review.

# Annex I

## Overview of greenhouse gas emissions and removals for Lithuania for submission year 2017 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Lithuania

1. Tables 6–9 provide an overview of total GHG emissions and removals as submitted by Lithuania.

Table 6
**Total greenhouse gas emissions for Lithuania, base year[a]–2015**
(kt $CO_2$ eq)

| | *Total GHG emissions excluding indirect $CO_2$ emissions* | | *Total GHG emissions including indirect $CO_2$ emissions[b]* | | *Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c]* | *KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[d]* | *KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)* | |
|---|---|---|---|---|---|---|---|---|
| | *Total including LULUCF* | *Total excluding LULUCF* | *Total including LULUCF* | *Total excluding LULUCF* | | | *CM, GM, RV, WDR* | *FM* |
| FMRL | | | | | | | | –4 552.00 |
| Base year | 44 534.95 | 48 046.84 | NA | NA | NA | | | |
| 1990 | 44 528.69 | 48 040.58 | NA | NA | | | | |
| 1995 | 18 530.84 | 22 326.11 | NA | NA | | | | |
| 2000 | 9 779.82 | 19 600.32 | NA | NA | | | | |
| 2010 | 10 881.33 | 20 782.48 | NA | NA | | | | |
| 2011 | 11 116.61 | 21 344.57 | NA | NA | | | | |
| 2012 | 12 010.84 | 21 227.96 | NA | NA | | | | |
| 2013 | 11 443.61 | 19 948.07 | NA | NA | | –6.41 | NA | –8 912.50 |
| 2014 | 12 537.14 | 19 869.14 | NA | NA | | 20.37 | NA | –8 428.79 |
| 2015 | 13 391.18 | 20 096.21 | NA | NA | | –262.26 | NA | –7 916.78 |

*Note*: Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

[a] Base year refers to the base year under the Kyoto Protocol, which is 1990 for $CO_2$, $CH_4$ and $N_2O$ and 1995 for HFCs, PFCs, $SF_6$ and $NF_3$. Lithuania has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] The Party has not reported indirect $CO_2$ emissions in CRF table 6.

[c] The value reported in this column refers to 1990.

[d] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely AR and deforestation.

Table 7
**Greenhouse gas emissions by gas for Lithuania, excluding land use, land-use change and forestry, 1990–2015**
(kt $CO_2$ eq)

| | $CO_2$[a] | $CH_4$ | $N_2O$ | HFCs | PFCs | Unspecified mix of HFCs and PFCs | $SF_6$ | $NF_3$ |
|---|---|---|---|---|---|---|---|---|
| 1990 | 35 807.13 | 6 953.76 | 5 279.69 | NO | NO | NO | NO | NO |
| 1995 | 15 024.18 | 4 429.55 | 2 866.13 | 6.21 | NO | NO | 0.05 | NO |
| 2000 | 11 806.06 | 3 840.26 | 3 931.20 | 22.08 | NO | NO | 0.72 | NO |
| 2010 | 13 712.65 | 3 660.82 | 3 143.50 | 259.52 | NO | NO | 5.99 | NO |
| 2011 | 14 066.76 | 3 491.88 | 3 471.64 | 306.54 | NO | NO | 7.74 | NO |
| 2012 | 14 132.97 | 3 499.73 | 3 240.24 | 351.03 | NO | NO | 3.99 | NO |
| 2013 | 13 107.04 | 3 425.07 | 3 004.44 | 405.15 | NO | NO | 6.32 | 0.06 |
| 2014 | 12 874.38 | 3 432.90 | 3 106.10 | 449.48 | NO | NO | 5.98 | 0.29 |
| 2015 | 13 141.77 | 3 376.34 | 3 093.94 | 478.36 | NO | NO | 5.54 | 0.26 |
| **Per cent change 1990–2015** | **–63.3** | **–51.4** | **–41.4** | **NA** | **NA** | **NA** | **NA** | **NA** |

*Note*: Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.
[a] Lithuania did not report indirect $CO_2$ emissions in CRF table 6.

Table 8
**Greenhouse gas emissions by sector for Lithuania, 1990–2015**
(kt $CO_2$ eq)

| | Energy | IPPU | Agriculture | LULUCF | Waste | Other |
|---|---|---|---|---|---|---|
| 1990 | 33 107.67 | 4 502.71 | 8 853.48 | –3 511.89 | 1 576.72 | NO |
| 1995 | 14 062.38 | 2 243.06 | 4 442.38 | –3 795.28 | 1 578.29 | NO |
| 2000 | 10 808.18 | 3 094.39 | 4 156.97 | –9 820.50 | 1 540.77 | NO |
| 2010 | 12 874.68 | 2 239.19 | 4 329.22 | –9 901.15 | 1 339.40 | NO |
| 2011 | 12 028.98 | 3 719.53 | 4 345.41 | –10 227.95 | 1 250.64 | NO |
| 2012 | 12 071.29 | 3 565.42 | 4 379.52 | –9 217.12 | 1 211.74 | NO |
| 2013 | 11 419.70 | 3 000.41 | 4 357.33 | –8 504.46 | 1 170.64 | NO |
| 2014 | 11 049.58 | 3 176.87 | 4 529.73 | –7 331.99 | 1 112.96 | NO |
| 2015 | 11 057.09 | 3 396.58 | 4 600.30 | –6 705.03 | 1 042.25 | NO |
| **Per cent change 1990–2015** | **–66.6** | **–24.6** | **–48.0** | **90.9** | **–33.9** | **NA** |

*Notes*: (1) Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions. (2) Lithuania did not report indirect $CO_2$ emissions in CRF table 6.

Table 9

**Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2015, for Lithuania**

($kt\ CO_2eq$)

| | *Article 3.7 bis as contained in the Doha Amendment*[b] | *Article 3.3 of the Kyoto Protocol* | | *FM and elected Article 3.4 activities of the Kyoto Protocol* | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Land-use change* | *AR* | *Deforestation* | *FM* | *CM* | *GM* | *RV* | *WDR* |
| FMRL | | | | –4 552.00 | | | | |
| Technical correction | | | | –922.00 | | | | |
| Base year | NA | | | | NA | NA | NA | NA |
| 2013 | | –219.84 | 213.43 | –8 912.50 | NA | NA | NA | NA |
| 2014 | | –252.56 | 272.93 | –8 428.79 | NA | NA | NA | NA |
| 2015 | | –288.89 | 26.63 | –7 916.78 | NA | NA | NA | NA |
| **Per cent change base year–2015** | | | | | **NA** | **NA** | **NA** | **NA** |

*Note:* Values in this table include emissions on lands subject to natural disturbances, if applicable.

[a] Lithuania has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column refers to 1990.

2. Table 10 provides an overview of key relevant data for Lithuania's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10
**Key relevant data for Lithuania under Article 3, paragraphs 3 and 4, of the Kyoto Protocol**

| *Key parameters* | *Values* |
|---|---|
| Periodicity of accounting | (a) AR: commitment period accounting |
| | (b) Deforestation: commitment period accounting |
| | (c) FM: commitment period accounting |
| | (d) CM: not elected |
| | (e) GM: not elected |
| | (f) RV: not elected |
| | (g) WDR: not elected |
| Election of activities under Article 3, paragraph 4 | None |
| Election of application of provisions for natural disturbances | No |
| 3.5% of total base-year GHG emissions, excluding LULUCF and including indirect $CO_2$ emissions | 1 686.878 kt $CO_2$ eq (13 495.031 kt $CO_2$ eq for the duration of the commitment period) |
| Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for: | |
| 1. AR in 2015 | NA |
| 2. Deforestation in 2015 | NA |
| 3. FM in 2015 | NA |
| 4. CM in 2015 | NA |
| 5. GM in 2015 | NA |
| 6. RV in 2015 | NA |
| 7. WDR in 2015 | NA |

# Annex II

## Information to be included in the compilation and accounting database

Tables 11–13 include the information to be included in the compilation and accounting database for Lithuania. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable), as well as the final data to be included in the compilation and accounting database.

Table 11
**Information to be included in the compilation and accounting database for 2015, including on the commitment period reserve, for Lithuania**
($t CO_2 eq$)

| | *Original submission* | *Revised estimates* | *Adjustment* | *Final* |
|---|---|---|---|---|
| **CPR** | 102 240 739 | | | 102 240 739 |
| **Annex A emissions for 2015** | | | | |
| $CO_2$ | 13 141 769 | | | 13 141 769 |
| $CH_4$ | 3 376 345 | | | 3 376 345 |
| $N_2O$ | 3 093 937 | | | 3 093 937 |
| HFCs | 478 358 | | | 478 358 |
| PFCs | NO | | | NO |
| Unspecified mix of HFCs and PFCs | NO | | | NO |
| $SF_6$ | 5 543 | | | 5 543 |
| $NF_3$ | 257 | | | 257 |
| **Total Annex A sources** | **20 096 210** | | | **20 096 210** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015** | | | | |
| 3.3 AR | −288 892 | | | −288 892 |
| 3.3 Deforestation | 26 630 | | | 26 630 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015** | | | | |
| 3.4 FM | −7 916 776 | | | −7 916 776 |

Table 12
**Information to be included in the compilation and accounting database for 2014 for Lithuania**
($t CO_2 eq$)

| | *Original submission* | *Revised estimates* | *Adjustment* | *Final* |
|---|---|---|---|---|
| **Annex A emissions for 2014** | | | | |
| $CO_2$ | 12 874 382 | | | 12 874 382 |
| $CH_4$ | 3 432 904 | | | 3 432 904 |
| $N_2O$ | 3 106 103 | | | 3 106 103 |
| HFCs | 449 480 | | | 449 480 |
| PFCs | NO | | | NO |
| Unspecified mix of HFCs and PFCs | NO | | | NO |
| $SF_6$ | 5 976 | | | 5 976 |
| $NF_3$ | 291 | | | 291 |
| **Total Annex A sources** | **19 869 136** | | | **19 869 136** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014** | | | | |
| 3.3 AR | −252 561 | | | −252 561 |
| 3.3 Deforestation | 272 932 | | | 272 932 |
| **FM and elected activities under Article 3, paragraph 4,** | | | | |

| | *Original submission* | *Revised estimates* | *Adjustment* | *Final* |
|---|---|---|---|---|
| **of the Kyoto Protocol for 2014** | | | | |
| 2/KP/M | –8 428 786 | | | –8 428 786 |

Table 13
**Information to be included in the compilation and accounting database for 2013 for Lithuania**
($t CO_2 eq$)

| | *Original submission* | *Revised estimates* | *Adjustment* | *Final* |
|---|---|---|---|---|
| **Annex A emissions for 2013** | | | | |
| $CO_2$ | 13 107 038 | | | 13 107 038 |
| $CH_4$ | 3 425 069 | | | 3 425 069 |
| $N_2O$ | 3 004 435 | | | 3 004 435 |
| HFCs | 405 146 | | | 405 146 |
| PFCs | NO | | | NO |
| Unspecified mix of HFCs and PFCs | NO | | | NO |
| $SF_6$ | 6 323 | | | 6 323 |
| $NF_3$ | 56 | | | 56 |
| **Total Annex A sources** | **19 948 067** | | | **19 948 067** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013** | | | | |
| 3.3 AR | –219 839 | | | –219 839 |
| 3.3 Deforestation | 213 432 | | | 213 432 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013** | | | | |
| 3.4 FM | –8 912 495 | | | –8 912 495 |

# Annex III

## Additional information to support findings in table 2

### Missing categories that may affect completeness

The categories for which methods are included in the 2006 IPCC Guidelines that were reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party's inventory are the following:

(a) $CO_2$, $CH_4$ and $N_2O$ emissions in category 1.A.4.c.iii fishing for 1990–1994 (see ID# E.13 in table 5);

(b) $CO_2$ emissions from paraffin wax use in category 2.D.2 for 1990–2000 (see ID# I.13 in table 5);

(c) HFC emissions from disposal of imported refrigerators in category 2.F.1 refrigeration and air conditioning (see ID# I.17 in table 5);

(d) CSC in mineral soils for land converted to forest land (see ID# L.4 in table 3);

(e) CSC in litter for the dead organic matter pool under FM (see ID# KL.3 in table 5).

# Annex IV

## Documents and information used during the review

### A. Reference documents

**Reports of the Intergovernmental Panel on Climate Change**

IPCC. 1997. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency.
Available at https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies.
Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (ed.). Geneva: IPCC.
Available at http://www.ipcc-nggip.iges.or.jp/public/wetlands/.

**Annual review reports**

Reports on the individual review of the 2015 and 2016 annual submissions of Lithuania, respectively, contained in documents FCCC/ARR/2015/LTU and FCCC/ARR/2016/LTU.

**Other**

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat.
Available at http://unfccc.int/resource/webdocs/agi/2017.pdf.

Annual status report for Lithuania for 2017.
Available at http://unfccc.int/resource/docs/2017/asr/ltu.pdf.

Institute of Animal Science, Lithuanian University of Health Sciences. 2007. *Livestock manual (*Gyvulininkystės žinynas). Baisogala, Lithuania.

Standard independent assessment report, part 1, for Lithuania for 2017. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_part_1_lt_v1.0_2017.pdf.

Standard independent assessment report, part 2, for Lithuania for 2017. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_part_2_lt_v1.0_2017.pdf.

### B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Jolanta Merkeliene (Ministry of Environment of Lithuania), including additional material on the methodology and assumptions used.